B. M.
(N.H.)

# CATALOGUE

OF THE

# UNGULATE MAMMALS

IN THE

# BRITISH MUSEUM (NATURAL HISTORY).

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VOL. IV.

## ARTIODACTYLA,

FAMILIES CERVIDÆ (DEER),

TRAGULIDÆ (CHEVROTAINS),

CAMELIDÆ (CAMELS AND LLAMAS),

SUIDÆ (PIGS AND PECCARIES), AND

HIPPOPOTAMIDÆ (HIPPOPOTAMUSES).

By R. LYDEKKER, F.R.S.

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# PREFACE

The preparation of the fourth Volume of Ungulate Mammals was nearing completion when its author was struck down by the illness that proved fatal. With his characteristic devotion to work, he hardly allowed this to make any difference, under circumstances when most men would have considered themselves unfit for mental effort. It would perhaps have been better if the patient had allowed himself to rest, but the correction of the proofs went on until the task was completed, only two or three days before the end came, on April 16th.

Mr. Lydekker, although not a member of the permanent staff, had been officially connected with the Museum since 1884. Only those who have seen the work from the inside will be able to realise the extent and the value of his services to the Museum, where his colleagues have the remembrance of a long and highly successful period of help unremittingly and ungrudgingly given.

The present Volume includes the families Cervidæ, Tragulidæ, Camelidæ, Suidæ and Hippopotamidæ, thus completing the Artiodactyla. Like its predecessors, it has been prepared by Mr. Lydekker.

It was hoped that the Catalogue would be completed shortly by the publication of a fifth Volume, including the Perissodactyla, the Hyracoidea, and the Proboscidea, together with *addenda* to the earlier volumes. It is not possible at present to state whether this intention can be carried out.

SIDNEY F. HARMER,
*Keeper of Zoology.*

British Museum (Natural History),
London, S.W.
*April 19th*, 1915.

# INTRODUCTION

In the preparation of this volume I have not had the valuable assistance of Mr. Blaine, who, for the first portion of the period, was away on a hunting-trip in Africa, and during the remainder was serving his King and country in the war.

As in the case of the previous volumes, I am greatly indebted to Mr. O. Thomas for reading the proofs, and using his unrivalled knowledge of individual specimens and their localities to correct errors which had crept into the text. In the present volume my debt to him is still greater, for being myself incapacitated by illness from coming to London during the time the proofs were passing through the press, the drudgery of filling up omissions in the references to literature fell to his share.

It may be added that I cannot but regret the appearance in the text of such ugly, ungrammatical, or absurd terms as "tunjuc," "Odocoileus,"* and "Hippocamelus,"†—terms which would never have been admitted by the past generation of naturalists, from whose instruction and writings I derived the basis of my zoological knowledge. According, however, to modern views on nomenclature—views largely attributable to the decline in the study of the classics characteristic of the present age—such usage is practically compulsory. In one case, however, namely, that of the Kashmir stag, I could not bring myself to replace a classically-formed name by one of these ill-sounding barbarisms.

R. LYDEKKER.

*March* 10*th*, 1915.

* Applied to a subfossil deer's tooth, which, in the then state of knowledge, should have been described as *Cervus*.

† Given on the supposition that the Chilian guemal was intermediate between a horse and a llama.

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# CATALOGUE

OF

# UNGULATES.

## VOL. IV.

## SUBORDER **ARTIODACTYLA** (*continued*).

### SECTION A.—**PECORA** (*continued*).

### FAMILY IV.—CERVIDÆ.

PECORA, in which the cranial appendages—generally restricted to the males, and in a few cases absent even in that sex—take the form of (usually) branched, bony, solid, deciduous antlers, supported on permanent skin-covered pedicles arising from the frontal bones; upper canines generally present, very long in those genera which lack antlers in both sexes; lower canines with simple, uncleft crowns (fig. 1); cheek-teeth generally low-crowned (brachyodont); lateral toes generally present, with the constituent bones fully developed; lateral metacarpals wanting either upper or lower ends;* gall-bladder nearly always wanting; placenta with few cotyledons.

In all cases, with the possible exception of *Moschus*, there are two pairs of teats, and inguinal glands are invariably wanting. Face-glands are nearly always present (absent in *Capreolus*); tarsal, metatarsal, and interdigital

* The term plesiometacarpalian is applied to those genera in which the upper ends of the lateral metacarpals persist, and telemetacarpalian to those in which the reverse condition obtains.

glands in the hind-feet may be present, and in the Virginian deer there are also interdigital glands in the fore-feet.

In the Old World the range extends from the neighbourhood of the Arctic Circle southwards to the Mediterranean islands, the extreme north-west of Africa, the Malay Archipelago, and the Philippines: in the New World it includes the entire mainland of North and South America. The precise eastern limits of the family in the Austro-Malay area cannot

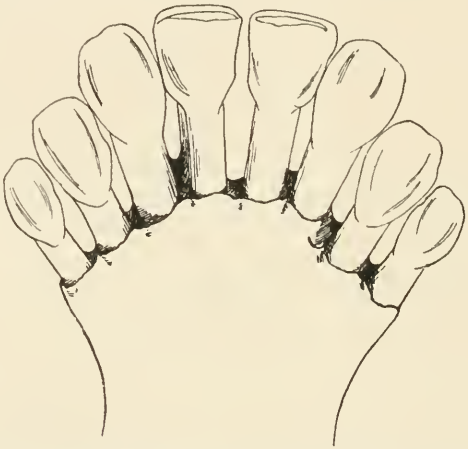

Fig. 1.—Lower Front Teeth of Elk (*Alces alces*).
From Miller, *Cat. Mamm. Western Europe.*

be defined, owing to the transportation by the Malays of species from one island to another.

The family is divisible into the two following subfamily groups:—

A. Liver with a gall-bladder; a caudal gland in male; no face-glands, foot-glands, or antlers ..... *Moschinæ.*

B. Liver without a gall-bladder; no caudal gland; face-glands,* foot-glands,† at least in hind-limbs, and antlers ‡ usually present ..... *Cervinæ.*

---

* Wanting in *Capreolus.*
† Wanting in *Pudu.*
‡ Wanting in *Hydropotes.*

## Subfamily i.—MOSCHINÆ.

Liver with a gall-bladder; in skull the canal situated within margin of eye-sockets, and leading into nose-chamber, with only a single orifice; no face-glands or lachrymal pits below eyes; hemispheres of brain comparatively smooth, with few convolutions; antlers wanting; no foot-glands, but a large caudal and a preputial gland in males.

The distribution extends from Gilgit over a large area in Central and North-eastern Asia, including Cochin China, Amurland, and Korea. Following Fitzinger, Pocock regards this group as of family rank (*Moschidæ*), a view which has much to be said in its favour, as the single genus is in several respects intermediate between the *Bovidæ* and the typical *Cervidæ*.

### I. Genus MOSCHUS.

Moschus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 66, 1758, ed. 12, vol. i, p. 91, 1766; *Flower*, *Proc. Zool. Soc.* 1875, p. 159; *Garrod*, *ibid.* 1877, p. 287; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 19, 1881; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 551, 1891; *Lydekker*, *Deer of All Lands*, p. 311, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 937.

Odontodorcas, *Gistel*, *Naturgesch. Thierreichs*, p. 82, 1848.

Build stout and heavy, with the limbs, especially the hind-pair, long and thick, and the rump elevated; hair coarse, thick, brittle, minutely waved, and in structure resembling pith; ears large; upper canines greatly developed in males, and projecting far below the level of the lips, in females much smaller; no tarsal or metatarsal glands or tufts; lateral metacarpals represented by their lower extremities; main hoofs narrow and pointed, lateral hoofs large and functional; tail very short in males, terminating in a tuft and glandular, in the females evenly haired throughout; naked portion of muzzle large and completely surrounding nostrils.

Distribution co-extensive with that of subfamily.

## MOSCHUS MOSCHIFERUS.

Moschus moschiferus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 66, 1758, ed. 12, vol. i, p. 91, 1766; *Pallas, Spicil. Zool.* fasc. xiii, p. 29, pl. iv, 1780, *Zoogr. Rosso-Asiat.* p. 108, 1811; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 61, vol. v, p. 307, 1827; *Gray, Proc. Zool. Soc.* 1836, p. 63, *List Mamm. Brit. Mus.* p. 172. 1843, *Cat. Ungulata Brit. Mus.* p. 244, 1852, *Cat. Ruminants Brit. Mus.* p. 96, 1872, *Hand-List Ruminants Brit. Mus.* p. 166, 1873; *Hutton, Journ. Asiat. Soc. Bengal*, vol. vi, p. 935, 1837; *Hodgson, ibid.* vol. xvi, p. 693, 1847, vol. xvii, pt. 2, p. 486, 1848; *Adams, Proc. Zool. Soc.* 1858, p. 328; *Schrenk, Reis. u. Forsch. Amurland, Säugeth.* p. 161, 1859; *Raddc, Reis. Süd-Ost. Siber., Säugeth.* p. 274, 1862; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 269, 1862; *Blyth, Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 157, 1863; *Milne-Edwards, Ann. Sci. Nat., Zool.* ser. 4, vol. ii. p. 119, 1874, *Rech. Mamm.* p. 176, 1874; *Jerdon, Mamm. India*, p. 266, 1867; *Kinloch, Large Game Shooting*, p. 41, 1869; *David, Arch. Mus. Paris*, vol. vii, *Bull.* p. 75, 1871; *Brooke, Proc. Zool. Soc.* 1872, p. 522; *Flower, ibid.* 1875, p. 159; *Przewalski, Reise Mongolia*, pp. 174 and 240, 1875; *Garrod, Proc. Zool. Soc.* 1877, p. 287; *Lydekker, Journ. Asiat. Soc. Bengal*, vol. xlvi, pt. 2, p. 286, 1877, *Horns and Hoofs*, p. 330, 1893, *Deer of All Lands*, p. 311, 1898, *Great and Small Game of India, etc.* p. 247, 1900, *Great and Small Game of Europe, etc.* p. 268, 1901, *Game Animals of India, etc.* p. 266, 1907, *Cat. Hume Bequest Brit. Mus.* p. 40, 1913; *Scully, Proc. Zool. Soc.* 1881, p. 209; *Forbes, ibid.* 1882, p. 636; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 283, 1884; *Sterndale, Mamm. India*, p. 494, 1884; *Büehner, Mélanges Biol.* vol. xiii, p. 163, 1890; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 172, 1891; *Blanford, Fauna Brit. India, Mamm.* p. 552, 1891; *Flower and Lydekker, Study of Mammals*, p. 314, 1891; *Pousargues, Mém. Soc. Zool. France*, vol. xi, p. 189, 1898; *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xix, p. 129, 1903; *Elliot, Cat. Mamm. Field Mus. (Zool. Pub. Field Mus.* vol. viii) p. 38, 1907; *Ward, Records of Big Game*, ed. 6, p. 114, 1910, ed. 7, p. 112. 1914; *Pocock, Proc. Zool. Soc.* 1910, p. 937; *Sulima, Naša ochota, St. Pétersb.* vol. xlviii, p. 40, 1910; *Thomas, Proc. Zool. Soc.* 1911, p. 150; *Cabrera, Cat. Met. Mam. Mus. Madrid*, p. 129, 1912; *Aoki, Annot. Zool. Japon.* vol. viii, p. 344, 1913; *Dodsworth, Journ. Bombay Nat. Hist. Soc.* vol. xxii, p. 748, 1914.

Musk-Deer; Kastura.

Typical locality "Tatary, approaching China."

Typically height at shoulder about 20 inches, at rump 2 inches more. General colour some shade of rich dark brown, more or less mottled and speckled with light grey, the individual hairs being white for about three-quarters of their length, then with a white band, followed by a blackish tip; under-parts and inner side of limbs paler; chin, inner

border of ears, and inside of thighs whitish; in some instances a white spot on each side of the throat.

The following three forms have been recognised as distinct:—

A. Size larger; feet and hoofs large.
  *a*. Ears coloured like back ..... *M. m. moschiferus*.
  *b*. Ears largely or wholly black externally ..... *M. m. sifanicus*.
B. Size smaller; feet and hoofs small..... *M. m. parvipes*.

## A.—Moschus moschiferus moschiferus.

Moschus sibiricus, *Pallas*, *Spicil. Zool.* fasc. xiii, p. 29, 1780; *Gray*, *Cat. Ungulata Brit. Mus.* p. 243, 1852; *Gerrard*. *Cat. Bones Mamm. Brit. Mus.* p. 269, 1862.

Moschus altaicus, *Eschscholtz*, *Isis*, 1830, p. 606.

Moschus moschiferus altaicus, *Brandt*, *Medicin. Zool.* vol. ii, p. 347, 1833.

Moschus chrysogaster, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. viii, p. 203, 1839; *Gray*, *Cat. Ungulata Brit. Mus.* p. 245, 1852, *Cat. Ruminants Brit. Mus.* p. 97, 1872; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 269, 1862.

Moschus leucogaster, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. viii, p. 203, 1839; *Gray*, *Cat. Ungulata Brit. Mus.* p. 245, 1852, *Cat. Ruminants Brit. Mus.* p. 96, 1872.

Moschus saturatus, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. viii, p. 203, 1839.

Odontodorcas moschiferus, *Gistel*, *Naturgesch. Thierreichs*, p. 82, 1848.

Moschus moschiferus fasciatus, *Milne-Edwards*, *Ann. Sci. Nat., Zool.* ser. 5, vol. ii, p. 119, 1864; *Gray*, *Cat. Ruminants Brit. Mus.* p. 96, 1872.

Moschus moschiferus maculatus, *Milne-Edwards*, *Ann. Sci. Nat., Zool.* ser. 5, vol. ii, p. 120, 1864; *Gray*, *Cat. Ruminants Brit. Mus.* p. 96, 1872.

Moschus moschiferus concolor, *Milne-Edwards*, *Ann. Sci. Nat., Zool.* ser. 5, vol. ii, p. 121, 1864; *Gray*, *Cat. Ruminants Brit. Mus.* p. 96, 1872.

Typical locality "Tatary, approaching China."

General characters those of the species; ears relatively short, coloured externally like back. Even in the Himalayan area considerable individual or local variations in colour are noticeable; some examples being paler than ordinary, while others tend to the development of a yellowish tinge, especially on the under-parts, and yet others to blackish.

The name *M. m. chrysogaster* is available for the Himalayan form, if, as is probable, this proves to be a distinct race. Allen suggested that the Siberian form might be known as

*M. sibiricus*, presumably on the supposition that the Himalaya is the typical locality.

42. 4. 29. 75 (677, *a*). Skin, mounted, and skull (42. 4. 29. 77). Siberia.
*Presented by the St. Petersburg Academy*, 1842.

42. 4. 29. 75 (677, *b*). Skin, mounted, and skull (42. 4. 27. 78). Siberia. *Same history.*

43. 1. 12. 93. Skull and skin. Nepal. Type of *M. chrysogaster*. *Presented by B. H. Hodgson, Esq.*, 1843.

43. 1. 12. 94 (678, *b*). Skull. Nepal. *Same history.*

678, *a*. Skull. Nepal. *Same history.*

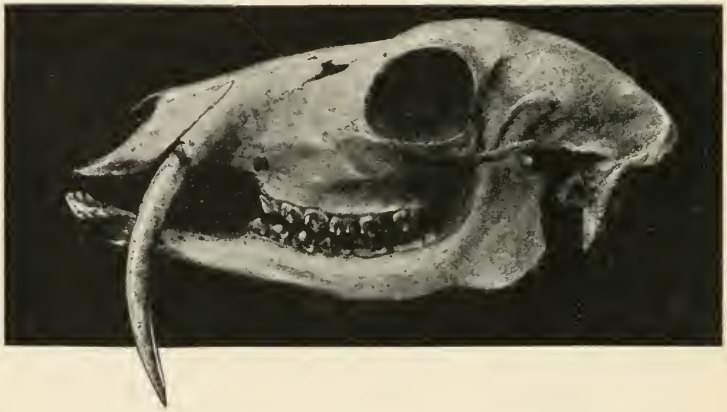

Fig. 2.—Skull of Musk-Deer (*Moschus moschiferus*).

43. 1. 12. 95. Skull and skin. Nepal. Type of *M. leucogaster*. *Same history.*

43. 1. 12. 97 (676, *i*). Skull. Kachar. Type of "*M. eacharensis*." *Same history.*

43. 1. 12. 98 (676, *j*). Skull. Nepal. Type of *M. saturatus*. *Same history.*

45. 1. 8. 327. Skin, immature, mounted. Nepal.
*Same donor*, 1845.

45. 1. 8. 356 (676, *a*). Skull. Nepal. *Same history.*

45. 1. 8. 357 (676, *b*). Skull. Nepal. *Same history.*

45. 1. 12. 458 (676, *d*). Skeleton. Nepal. *Same history.*

45. 1. 12. 449 (676, *e*). Skeleton. Nepal. *Same history.*

45. 1. 12. 555 (676, *c*). Skeleton. Nepal. *Same history.*

48. 6. 11. 26 (676, *f*). Skull. Sikhim.

*Presented by B. H. Hodgson, Esq.*, 1848.

55. 1. 20. 9. Skin, mounted. Nepal.

*Presented by H.H. Maharaja Dhuleep Singh*, 1855.

56. 5. 6. 68 (676, *h*). Skull, immature. Kashmir; collected by W. Theobald, Esq.

*Presented by Dr. T. Oldham*, 1856.

56. 10. 1. 3 (676, *g*). Skull. Himalaya.

*Purchased (Baker)*, 1856.

676, *k*. Skull, female. Himalaya (?). *No history.*

79. 11. 21. 254–5. Two skins. Locality unknown.

*Transferred from the India Museum*, 1879.

81. 3. 1. 4. Skin, young. Basal Gak, Gilgit; collected by Lieut.-Col. J. Biddulph, July, 1879.

*Presented by Dr. J. Scully*, 1881.

91. 8. 7. 221–2. Two skulls. Kashmir.

*Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 223. Skull. Garhwal. *Same history.*

91. 10. 7. 124. Skull. Sikhim; collected by L. Mandelli, Esq. *Presented by Dr. W. T. Blanford*, 1891.

91. 10. 7. 125. Skull, female. Same locality and collector. *Same history.*

96. 9. 9. 1. Skin, mounted. Amurland; collected by Herr Döries. *Purchased (Ward)*, 1896.

97. 4. 3. 4. Skin, female, mounted. From an animal formerly living in the park at Woburn Abbey.

*Presented by the Duke of Bedford, K.G.*, 1907.

8. 2. 29. 4. Skull and skin. Kishi Nala, Garhwal.

*Presented by Dr. F. G. Longstaff*, 1908.

12. 10. 31. 97. Skull. Garhwal. In this specimen, which stands 7th in Ward's 1910 list, the length of the exposed portion of the upper canine is 3 inches; the maximum recorded length being 4 inches.

*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

12. 10. 31. 98. Skull. Himalaya. *Same history.*

## B.—Moschus moschiferus sifanicus.

Moschus sifanicus, *Büchner*, *Mélanges Biol.* vol. xii, p. 162, 1890; *Lydekker*, *Deer of All Lands*, p. 315, 1898, *Great and Small Game of Europe, etc.*, p. 269, 1901; *Pousargues*, *Mém. Soc. Zool.*

*France*, vol. viii, p. 192, 1898; *Allen, Bull. Mus. Harvard Coll.* vol. xl, p. 205, 1912; *Wallace, Big Game of Central and Western China*, p. 146, 1913.

Typical locality Southern Kan-su, Western China.

Ears longer than in typical race, and, instead of being similar to the back in colour, more or less completely black, or black at the bases, with broad yellowish tips, and the margins of the upper half with a blackish or brownish band; internally the margins covered with yellowish hair showing a more or less decided rufous tinge. Skull more massive, and longer in its anterior half; the nasals being narrower, longer, and articulating with only a small portion of the frontals.

1. 3. 2. 6. Skull and skin, female. Ichang, Central China. May represent a distinct race.

*Presented by F. W. Styan, Esq.*, 1901.

3. 5. 15. 6. Skull and skin, immature. Sze-chuan, Western China. *Same donor*, 1903.

11. 2. 1. 265. Skull and skin, female. N.W. of Tan-chou, Kan-su; collected by M. P. Anderson, Esq. Practically a topo-type. *Presented by the Duke of Bedford, K.G.*, 1911.

11. 9. 8. 144. Skull and skin. Wen-chwan-hsien, Si-ho valley, western Sze-chuan; same collector. *Same history.*

### C.—Moschus moschiferus parvipes.

Moschus parvipes, *Hollister, Proc. Biol. Soc. Washington*, vol. xxiv, p. 1, 1911.

Typical locality Korea.

Smaller than preceding races, with more slender limbs and smaller hoofs; general colour rich and dark, and winter coat relatively short.

97. 10. 3. 58. Body-skin. Korea; collected by Mr. J. Kalinowski. *Purchased*, 1897.

## Subfamily ii.—CERVINÆ.

Liver without gall-bladder; in skull the canal situated within margin of eye-sockets, and leading into nose-chamber, with two orifices; face-glands and lachrymal pits usually

present;* hemispheres of brain with numerous convolutions; antlers present, except in *Hydropotes;* foot-glands usually present;† no caudal or preputial glands.

The following is a "key," mainly based on external characters, to genera here recognised:—

A. Antlers absent in females; muzzle with at least a small bare muffle.
  *a*. Upper canines tusk-like in males.
    $a^1$. Antlers wanting; naviculo-cuboid and cuneiform bones of tarsus separate ..... *Hydropotes.*
    $b^1$. Antlers present, surmounting long pedicles and relatively small; naviculo-cuboid and cuneiform bones of tarsus united.
      $a^2$. Antler-pedicles continued downwards as prominent converging frontal ridges ..... *Muntiacus.*
      $b^2$. Antler-pedicles divergent, not continued downwards as prominent frontal ridges..... *Elaphodus.*
  *b*. Upper canines, when present, not tusk-like.
    $b^1$. Lateral metacarpals represented by their upper extremities.‡
      $b^2$. Antlers with a simple basal or sub-basal brow-tine, and at least two other tines; tail short or medium.
        $b^3$. Antlers markedly palmate; upper canines wanting; hoofs of hind-feet united only at "heels" § by a close fold of skin ..... *Dama.*
        $c^3$. Antlers not markedly palmate; upper canines generally present‖; hind-hoofs united nearly throughout their basal depth by a deep interungual web ..... *Cervus.*
      $c^2$. Antlers not forking till some distance above base, and the front tine again forked; tail long ..... *Elaphurus.*
    $c^1$. Lateral metacarpals represented by their lower extremities.
      $c^2$. Vomer not dividing posterior aperture of nostrils into two chambers.
        $c^3$. Antlers diverging at an angle of about 40° to mid frontal suture, 3-tined; face-glands wanting; muzzle normal; tail rudimentary ..... *Capreolus.*
        $d^3$. Antlers diverging nearly at right angles to mid frontal suture; many tined and often palmate; face-glands present; muzzle pendulous, with very small bare muffle; tail short ..... *Alces.*

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* Wanting in *Capreolus* and one species of *Pudu.*
† Wanting in *Pudu.*
‡ Occasionally wanting.
§ See vol. i, p. 172.
‖ Wanting in subgenus *Hyelaphus*, and occasionally *Axis.*

$d^2$ Vomer dividing posterior aperture of nostrils into two distinct chambers.
$d^3$. Naviculo-cuboid of tarsus free from cuneiform.
$d^4$. Metatarsal glands normally present, tarsal glands always developed.
$d^5$. Antlers normally complex, with subbasal snag, and front-prong of main fork developed at expense of hind one ..... *Odocoilcus.*
$c^4$. Metatarsal glands wanting.
$c^5$. Antlers dichotomously forking, without subbasal snag and with more than two tines..... *Blastoccrus.*
$c^6$. Antlers simply forked ..... *Hippocamelus.*
$c^7$. Antlers simple spikes..... *Mazama.*
$c^3$. Naviculo-cuboid of tarsus fused with cuneiform. Antlers minute; no metatarsal, tarsal, or pedal glands..... *Pudu.*
$b^2$. Antlers present in females; muzzle completely hairy.
Lateral metacarpals and vomer as in *Odocoilcus*. ... *Rangifer.*

## II. Genus MUNTIACUS.

Muntiacus, *Rafinesque*, *Analyse de la Nature*, p. 56, 1815.
Cervulus, *Blainville*, *Bull. Soc. Philom.* 1816, p. 77; *Brooke*, *Proc. Zool. Soc.* 1878, p. 898; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 23, 1881; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 531, 1891; *Lydekker*, *Deer of all Lands*, p. 203, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 952.
Muntjaccus, *Gray*, *Thomson's Ann. Philos.* vol. xxvi, p. 342, 1825.
Stylocerus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 319, 1827.
Prox, *Ogilby*, *Proc. Zool. Soc.* 1836, p. 135.
Muntjacus, *Gray*, *List Mamm. Brit. Mus.* p. 173, 1843.

Small, high-rumped deer, with the lateral metacarpals represented by their upper extremities (plesiometacarpalian type), tusk-like upper canines, and small simple antlers, consisting of a basal brow-tine and a beam, and surmounting long bony pedicles, continued downwards as prominent convergent ridges on the frontal region of the skull; in females the pedicles represented by tufts of bristly hair and small bony prominences. Suborbital face-glands large, a pair of frontal glands of variable size on the inner sides of the frontal ridges, and glands forming deep clefts on front of hind-pasterns, but no tarsal or metatarsal glands or tufts; face long, with a large bare muffle extending up between the

nostrils, where its upper border is slightly convex; ears rather small; tail, long, thin, and pointed; lateral hoofs small, rudimentary, or wanting, and no bones of the lateral digits retained; coat uniformly coloured in adult, spotted with white in young, at least in the more typical forms. In the skull the lachrymal pits very large and deep, and the unossified vacuities of moderate extent; naviculo-cuboid of tarsus fused with cuneiform.

The group is distributed all over the Indo-Malay countries, as far east as Sumatra and Borneo, and the greater part of China proper; occurring also in Formosa, but not in Japan.

The species are distinguishable as follows:—

A. Upper surface of tail chestnut or fulvous; frontal glands present.
  *a*. Generally no nuchal stripe; frontal glands larger; lachrymal pits smaller; backs of ears dusky or yellow.
    *a'*. Size larger; colour redder, backs of ears dusky ... *M. muntjak.*
    *b'*. Size smaller; colour more fulvous; backs of ears yellow, like forehead ... *M. lacrymans.*
  *b*. Generally a nuchal stripe; frontal glands smaller; lachrymal pits larger; backs of ears blackish.
    *a''*. Size smaller; colour redder; lachrymal pits slightly smaller than orbits ... *M. reevesi.*
    *b''*. Size larger; colour browner and darker; lachrymal pits as large as or rather larger than orbits ... *M. sinensis.*

B. Upper surface of tail black or blackish; no frontal glands.
  *a*. Head not tufted; tail shorter; size smaller ... *M. fæ.*
  *b*. Head tufted; tail longer; size larger ... *M. crinifrons.*

## I. MUNTIACUS MUNTJAK.

Cervus muntjak, *Zimmermann, Geogr. Geschichte*, vol. ii, p. 131, 1780; *Boddaert, Elenchus Anim.* vol. i, p. 136, 1785; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 144, 1827; *F. Cuvier, Hist. Nat. Mamm.* vol. iv, pls. 418, 419, 1839.

Cervus muntjac, *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 180, 1788; *Kerr, Linn.'s Anim. Kingdom*, p. 307, 1793; *Horsfield, Zool. Research. Java*, pt. vi, pl. xxxiii, 1823; *J. B. Fischer, Synop. Mamm.* p. 454, 1829; *Sykes, Proc. Zool. Soc.* 1831, p. 104; *Ogilby, Royle's Illustr. Bot. Himalaya*, p. 72, 1839; *Elliot, Madras Journ.* vol. x, p. 221, 1839; *Müller and Schlegel, Verh. Nederland. Ges.* vol. i, p. 225, 1840; *Wagner, Schreber's Säugthiere, Suppl.* vol. v, p. 388, 1855.

Muntiacus muntjak, *Rafinesque, Analyse de la Nature*, p. 56, 1815.

(?) Cervulus subcornutus, *Blainville, Bull. Soc. Philom.* 1816, p. 77.

Cervus (Stylocerus) muntjak, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 319, 1827.

(?) Cervus (Stylocerus) subcornutus, *H. Smith, op. cit.* p. 320, 1827.

Stylocerus muntjak, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 185, 1835.

(?) Stylocerus subcornutus, *Jardine, loc. cit.* 1835.

Prox moschatus, *Ogilby, Proc. Zool. Soc.* 1836, p. 136.

Prox muntjac, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 85; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 362, 1872, vol. lxxix, pt. 1, p. 41, 1879.

Cervulus muntjac, *Brooke, Proc. Zool. Soc.* 1874, p. 38, 1878, p. 899; *Anderson, Zool. Results Yunnan Exped.* p. 337, 1878; *Sterndale, Mamm. India*, p. 500, 1884; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 286, 1884; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 173, 1891; *Blanford, Fauna Brit. India, Mamm.* p. 552, 1891; *Flower and Lydekker, Study of Mammals*, p. 317, 1891; *Lydekker, Horns and Hoofs*, p. 314, 1893, *Deer of All Lands*, p. 203, 1898, *Great and Small Game of India, etc.* p. 238, 1900, *Game Animals of India, etc.* p. 257, 1907, *Cat. Hume Bequest, Brit. Mus.* p. 40, 1913; *Percy, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 268, 1894; *Jentink and Büttikofer, Notes Leyden Mus.* vol. xix, p. 63, 1897; *Holding, Proc. Zool. Soc.* 1899, p. 295; *Finn, ibid.* 1903, vol. ii, p. 2; *Manners-Smith, Journ. Bombay Asiat. Soc.* vol. xvii, p. 237, 1906; *Comber, ibid.* vol. xviii, p. 490, 1908; *Ward, Records of Big Game*, ed. 6, p. 80, 1910, ed. 7, p. 80, 1914; *Pocock, Proc. Zool. Soc.* 1910, p. 952.

Muntiacus muntjac, *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 38, 1907; *Thomas and Wroughton, Proc. Zool. Soc.* 1909, p. 392; *Lyon, Proc. U.S. Nation. Mus.* vol. xl, p. 73, 1911.

Typical locality Java.

The type species.

Size relatively large, the shoulder-height ranging from about 20 to 22 inches; ears narrow and pointed; crown not tufted; frontal glands large; tail relatively short (about 7 inches); colour ranging from chestnut-red (deep rufous) to orange-tawny, with a brown or black streak down the front of each antler-pedicle, and in a corresponding position in females, a pale crown-patch, and a grizzled nuchal area; insides of ears, chin, upper part of throat, buttocks, inner sides of thighs, inner surfaces of fore-legs to knees, and under side of tail white; lateral hoofs very small; lachrymal pits occupying only lower half of lachrymal bone.

The range includes India, Burma, the Malay Peninsula, Siam, Java, Sumatra, Borneo, etc.

FIG. 3.—HEAD OF INDIAN MUNTJAC (*Muntiacus muntjak vaginalis*).
From a photograph lent by the Bombay Natural History Society.

Our knowledge of several of the races is too imperfect to admit of the drawing up of a satisfactory and trustworthy "key."

## A.—Muntiacus muntjak muntjak.

Muntjacus vaginalis, *Horsfield*, *Zool. Research. Java*, figs. *a* and *b*, 1824; *nec* Cervus vaginalis, *Boddaert*.

Cervulus vaginalis, *Gray*, *Proc. Zool. Soc.* 1850, p. 234, *Ann. Mag. Nat. Hist.* ser. 2, vol. v, p. 425, 1850, *Cat. Ungulata Brit. Mus.* p. 217, 1852; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 263, 1862; *nec* Cervus vaginalis, *Boddaert*.

Cervulus muntjac typicus, *Ward*, *Records of Big Game*, ed. 6, p. 80, 1910, ed. 7, p. 80, 1914.

Muntjac; Kakar; Barking Deer; Rib-faced Deer.

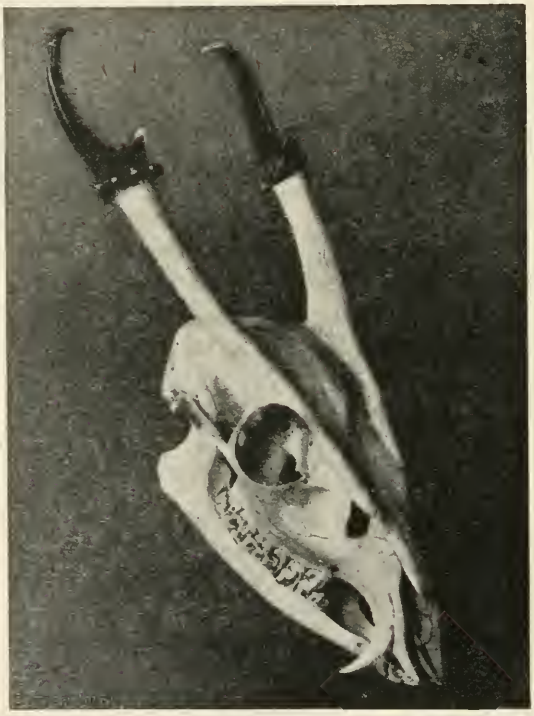

Fig. 4.—Skull and Antlers of Muntjac (*Muntiacus muntjak*).

Typical locality Java.

Size large (length of hind-foot $11\frac{3}{16}$ inches); general colour very dark rufous, without light rings to the hairs, so that there is no speckling; antlers larger than in any other race, the maximum recorded length being $10\frac{3}{8}$ inches. Basal length of skull $8\frac{1}{4}$ inches, of female $7\frac{1}{4}$ inches.

9. 1. 5. 854. Skin. Pangandaran, Dirk de Vries Bay, Java; collected by G. C. Shortridge, Esq.

*Presented by W. E. Balston, Esq.*, 1909.

9. 1. 5. 855. Skull and skin, female. Same locality and collector. *Same history.*

9. 1. 5. 1124. Frontlet and antlers, the latter very large. Same locality and collector. *Same history.*

9. 1. 5. 1125. A similar specimen, but with smaller antlers. Same locality and collector. *Same history.*

10. 4. 6. 71. Frontlet and antlers. Kangean Island, east of Java; same collector. *Presented by O. Thomas, Esq.*, 1910.

10. 4. 6. 72. A similar specimen. Same locality and collector. *Same history.*

10. 4. 6. 73. Another similar specimen. Same locality and collector. *Same history.*

## B.—Muntiacus muntjak moschatus.

Cervulus moschatus, *Blainville*, *Bull. Soc. Philom.* 1816, p. 77.

Muntiacus moschatus, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 582, 1907.

Typical locality Sumatra.

Type in Museum of Royal College of Surgeons.

A very large race, based on an immature skull, still retaining the last two pairs of milk-molars (No. 1469, Mus. R. Coll. Surg.). The external ridge of the jugal arcade is stated to be thicker and more prominent than in *M. m. vaginalis;* colour apparently much the same as in next race.

No specimen in collection.

## C.—Muntiacus muntjak bancanus.

Cervulus muntjac, *Jentink*, *Notes Leyden Mus.* vol. xiii, p. 209, 1891; *Willink*, *Natuurk. Tijdschr. Nederlandsch-Indie*, vol. xlv, p. 189, 1905.

Muntiacus bancanus, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 582, 1907, vol. xl, p. 72, 1911.

Typical locality Banka Island; also occurs on Billiton Island.

Type in U.S. National Museum, Washington.

Closely allied to *M. m. moschatus*, but smaller; skull similar to that of *M. m. rubidus* (*infra*, p. 16), but the

interpterygoid space narrower, and the lachrymo-maxillary suture longer. General colour rich rufous (between hazel and ferruginous), darker on middle line of back and paler on flanks; on neck and shoulders the ferruginous-hazel washed with blackish; crown bright ferruginous hazel.

In his second mention of this muntjac Lyon refers to it as a smaller race of *M. m. rubidus*.

No specimen in collection.

### D.—Muntiacus muntjak pleiharicus.

Cervulus pleiharicus, *Kohlbrugge*, *Natuurk. Tijdschr. Nederlandsch-Indie*, vol. lv, pt. 2, p. 192, pl. ii, fig. 1, 1896.

Muntiacus pleiharicus, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 583, 1906, vol. xxxiii, p. 550, 1907, vol. xl, p. 71, 1911.

Typical locality Pleihari, South-eastern Borneo.

A relatively small yellowish or ochre-coloured form, with an indistinct dark brown dorsal stripe; antler-pedicles short; basal length of skull from about $6\frac{3}{4}$ to $7\frac{1}{16}$ inches (171–178 mm.).

No specimen in collection definitely referable to this race.

### E.—Muntiacus muntjak rubidus.

Muntiacus rubidus, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xl, p. 73, 1911.

Typical locality Pamukang Bay, S.E. Borneo.

Type in U.S. National Museum, Washington.

Larger than the preceding race, with the general colour deep shining rufous (hazel of Lyon), darkening on middle line of back and everywhere suffused with blackish; whole frontal area between antler-pedicles (which are of normal length) showing a tendency to become black; antlers relatively short; females paler, with less darkening on middle line of back; basal length of skull about $7\frac{1}{2}$ inches (185 to 186 mm.).

The skull, which is very similar in this respect to the somewhat smaller one of *M. m. bancanus*, differs from that of *M. m. pleiharicus* by its superior size, longer and stouter antler-pedicles, and the presence of a distinct concavity in the profile at the base of the nasals. This muntjac is inferior in size to the Sumatran *M. m. moschatus*.

According to Kohlbrugge, its distinctness from *M. m. pleiharicus* is recognised by the natives of Borneo.

79. 5. 3. 21. Frontlet and antlers. Borneo; collected by A. H. Everett, Esq. *Purchased*, 1879.

87. 2. 10. 3. Skull and antlers. Rejang Valley, North Borneo; collected by H. B. Low, Esq. *Purchased*, 1887.

89. 1. 8. 8. Skull and skin, female. Baram, North Borneo; collected by Dr. C. Hose.

*Purchased* (*Gerrard*), 1889.

92. 2. 7. 19. Skull and skin, female. Mount Dulit, North Borneo; same collector. *Purchased* (*Gerrard*), 1892.

93. 3. 4. 10. Skull, with antlers, and skin. Spitang, North Borneo; collected by A. H. Everett, Esq. The frontal area between the pedicles of the antlers is rufous.

*Purchased* (*Gerrard*), 1893.

94. 6. 12. 11. Skull, with antler-pedicles, and skin. Mount Mulu, Baram Valley, E. Sarawak, N. Borneo; collected by Dr. Hose. Whole area between antler-pedicles black; the black continuing down nape of neck.

*Purchased* (*Gerrard*), 1894.

95. 5. 7. 5. Skull and skin, with antlers in latter, immature. Miri Valley, Sarawak, N. Borneo; collected by Dr. Hose. Forehead and neck coloured as in last specimen. *Purchased* (*Gerrard*), 1895.

95. 5. 7. 6. Skeleton. Mount Skiwa, Sarawak; same collector. *Same history.*

95. 12. 8. 1. Skull and skin, immature. Baram; same collector. *Same history.*

99. 12. 9. 83. Skull, with very small antlers, and skin. Mount Dulit; same collector. The whole frontal area between the black pedicle-streaks is dusky, with a tinge of rufous. *Purchased* (*Gerrard*), 1899.

6. 2. 2. 11. Skull, imperfect, with milk-molars, and skin. Mount Dulit; same collector.

*Purchased* (*Gerrard*), 1900

8. 7. 17. 24. Skull, with cheek-teeth much worn, and skin, to which the minute antlers are attached. North Borneo. This specimen indicates that the antlers in this race are generally small.

*Presented by the British North Borneo Company*, 1908.

* * * *. Skin, young in spotted coat. Miri, Sarawak; collected by Dr. Hose. *Purchased.*

### F.—Muntiacus muntjak robinsoni, subsp. n.

Typical locality Rhio Linga Archipelago.

Of the approximate size of *M. m. curvostylis* (*infra*), but with very long and slender antler-pedicles; basal skull-length 7 inches, in female $6\frac{5}{8}$ inches; length of upper tooth-row $2\frac{7}{16}$ inches, in female $2\frac{5}{16}$; upper part of forehead and bases of ears in female dull dusky chestnut.

9. 4. 1. 505. Skull, with antlers, and skin. Bintang Island, Rhio Linga Archipelago, Malaya; collected by H. C. Robinson, Esq. Basal length of skull 7 inches, length of upper series of cheek-teeth $2\frac{7}{16}$ inches.

*Presented by the Government of the Federated Malay States*, 1909.

9. 4. 1. 506. Skull and skin, female. Same locality and collector. Type. Basal length of skull $6\frac{5}{8}$ inches, length of upper series of cheek-teeth $2\frac{5}{16}$ inches. *Same history.*

### G.—Muntiacus muntjak peninsulæ, subsp. n.

Typical locality Pulu Pangkor, off Malay Peninsula.

A very large race, with moderately stout antler-pedicles and antlers; basal skull-length in type (female) $7\frac{1}{2}$ inches; length of upper series of cheek-teeth about $2\frac{1}{2}$ inches;* upper part of forehead and bases of ears (in female) bright chestnut.

79. 11. 21. 256. Skull and skin, immature; the former still retaining milk-teeth. Wellesley Province, Malay Peninsula; collected by Dr. J. Cantor.

*Transferred from India Museum*, 1879.

3. 2. 6. 78. Skull, with antlers. Biserat, Malay Peninsula. The cheek-teeth are but little worn, and of approximately the same size as in the next specimen.

*Presented by Messrs. H. C. Robinson and N. Annandale*, 1903.

10. 10. 1. 106. Skull and skin, female. Pulu Pangkor,

* This dimension varies considerably with age in all the races.

off Malay Peninsula; collected by H. C. Robinson, Esq. Type. Basal skull-length 7½ inches, length of upper tooth-row 2½ inches. The contrast between this specimen, in which the teeth are much worn, and the type of *M. m. robinsoni* (9. 4. 1. 506) in the matter of size is very striking.

*Presented by the Government of the Federated Malay States*, 1910.

0. 8. 4. 12. Frontlet and antlers, the latter very large. Singapore. This specimen, which represents an aged animal, would apparently agree well in size with the preceding.

*Presented by Dr. C. Hose*, 1900.

## H.—Muntiacus muntjak curvostylis.

Cervulus curvostylis, *Gray, Cat. Ruminants Brit. Mus.* p. 94, 1872, *Hand-List Ruminants Brit. Mus.* p. 165, 1873.

Cervulus muntjac curvostylis, *Ward, Records of Big Game*, ed. 6, p. 81, 1910, ed. 7, p. 80, 1914.

Typical locality Siam.

Founded on a deformed skull, in which the antler-pedicles are abnormally bent downwards, backwards, and outwards. Size medium (length of upper row of cheek-teeth in type $2\frac{3}{16}$ inches); general colour orange-tawny, fading to buffish on neck and under-parts.

61. 6. 1. 8 (1619, *a*). Skull, with antler-pedicles (deformed) and bases of antlers. Pachebone, Siam; collected by Monsieur Mouhot. Type. *Purchased*, 1861.

78. 6. 17. 17. Skull and skin, immature. Siam or Cambodia. *Presented by Monsieur Pierre*, 1878.

98. 10. 21. 7. Skin, immature female. Chantabori, Siam. *Presented by Capt. S. S. Flower*, 1898.

14. 6. 18. 36. Frontal portion of skull, with antlers. Mi-tau Forest, Raheng, Siam; collected by Karens.

*Presented by C. S. Barton, Esq.*, 1914.

14. 8. 22. 23. Body-skin. S. W. Siam.

*Presented by K. G. Gairdner, Esq.*, 1914.

## I.—Muntiacus muntjak grandicornis.

Cervulus muntjac grandicornis, *Lydekker*, *Field*, vol. civ, p. 780, 1904, *Game Animals of India, etc.* p. 261, 1907; *Ward*, *Records of Big Game*, ed. 6, p. 80, 1910, ed. 7, p. 80, 1914.

Muntiacus grandicornis, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 583, 1907; *Wroughton*, *M.S.* 1914.

Typical locality Amherst district, Burma.

A large race (basal length of skull about $7\frac{1}{2}$ inches, length of upper row of cheek-teeth about $2\frac{7}{16}$ inches), with very large and massive antlers (length in type $6\frac{3}{4}$ inches, basal girth $4\frac{7}{8}$ inches); general colour tawny ochery, with the grizzled nuchal area not extending behind the shoulders; hairs dull pale brown at the base, and the basal portion not paler than that above. The size is approximately as in the typical Javan race, and larger than in Indian muntjacs; while the colour is much duller and browner than in the Bornean and Malay races, with more brown on the fronts of the legs than is usually present in the latter.

4. 9. 23. 1. Skull, imperfect at hind part of base, with antlers. Thouagyen Forest, Amherst district, Burma. Type.

*Presented by D. H. Allen, Esq.*, 1904.

79. 11. 21. 190. Skull, with antlers, which are small. The cheek-teeth are less worn than in the preceding specimen, but the length of the whole row is approximately the same, although the basi-cranial length is less (7 inches).

*Transferred from India Museum*, 1879.

94. 12. 19. 6–7. Two skulls, with antlers, provisionally identified with this race. Lower Chindwin Valley, Upper Burma. In the second specimen (7) the antlers are small, the pedicles very slender, and the molars but slightly worn.

*Presented by C. F. Gilbert, Esq.*, 1894.

96. 5. 6. 1. Fragmentary skull and skin, young. Thibau, western Shan States. *Presented by E. W. Oates, Esq.*, 1896.

98. 2. 13. 1. Skin, mounted. Burma.

*Purchased (Gerrard)*, 1898.

14. 12. 8. 239. Skull and skin. Thaget, Little Tenasserim River; collected by G. C. Shortridge, Esq.

*Presented by the Bombay Natural History Society*, 1914.

14. 12. 8. 240. Skull and skin. Same locality and collector. *Same history.*

14. 12. 8. 241. Skull and skin, female. Same locality and collector. *Same history.*

14. 12. 8. 242. Skull and skin, female. Same locality and collector. *Same history.*

## J.—Muntiacus muntjak vaginalis.

Cervus vaginalis, *Boddaert, Elenchus Anim.* vol. i, p. 136, 1785.

Cervus moschatus, *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 147, 1827; nec Cervulus moschatus, *Blainville.*

Cervus (Stylocerus) moschatus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 319, 1827.

Cervus ratwa, *Hodgson, Asiat. Researches*, vol. xviii, pt. 2, p. 139, 1833, *Proc. Zool. Soc.* 1834, p. 99; *Ogilby, Royle's Illustr. Bot. Himalaya*, p. lxxiii, 1839; *Schinz, Synop. Mamm.* vol. ii, p. 549, 1844.

Cervus melas, *Ogilby, Royle's Illustr. Bot. Himalaya*, p. lxxiii, 1839.

Stylocerus ratwa, *Hodgson, Journ. Asiat. Soc. Bengal*, vol. x, p. 914, 1841.

Muntjacus vaginalis, *Gray, List Mamm. Brit. Mus.* p. 173, 1843, *Cat. Hodgson Collect.* p. 31, 1846.

(?) Cervus stylocerus, *Schinz, Synop. Mamm.* vol. ii, p. 549, 1844.

Prox ratva, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 85, 1846; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 362, 1873, vol. lxxix, pt. 1, p. 41, 1879.

Prox albipes, *Sundevall, loc. cit.* 1846; *Fitzinger, op. cit.* vol. lxviii, p. 362, 1873, vol. lxxix, p. 42, 1879.

Prox stylocerus, *Sundevall, loc. cit.* 1846; *Fitzinger, loc. cit.* 1873 and 1879.

Prox melas, *Sundevall, loc. cit.* 1846.

Stylocerus muntjacus, *Kelaart, Podromus Faunæ Zeylan.* p. 85, 1852; nec Cervus muntjak, *Zimmermann.*

Cervulus vaginalis, *Adams, Proc. Zool. Soc.* 1858, p. 536; *Blyth, Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 154, 1863; *Swinhoe, Proc. Zool. Soc.* 1869, p. 652, 1870, p. 644.

Styloceros muntjac, *Cantor, Journ. Asiat. Soc. Bengal*, vol. xv, p. 269, 1846; nec Cervus muntjak, *Zimmermann.*

Cervulus moschatus, *Gray, Knowsley Menagerie*, p. 65, 1850, *Proc. Zool. Soc.* 1850, p. 234, *Cat. Ungulata Brit. Mus.* p. 218, 1852, *Cat. Ruminants Brit. Mus.* p. 93, 1872, *Hand-List Ruminants Brit. Mus.* p. 163, 1873; *Horsfield, Cat. Mamm. E. India Mus.* p. 190, 1851; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 263, 1862; nec *Blainville.*

Cervulus aureus, *Jerdon, Mamm. India*, p. 264, 1867; *Blyth, Cat. Mamm. and Birds Burma*, p. 46, 1875; *Sterndale, Mamm. India*, p. 500, 1884; *Percy, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 288, 1894; partim.

Cervulus muntjac tamulicus, *Ward, Records of Big Game*, ed. 6, p. 81, 1910.

Muntiacus vaginalis, *Wroughton, Journ. Bombay Nat. Hist. Soc.* vol. xxi, p. 825, 1912; *Ryley* (*Miss*), *ibid.* vol. xxii, p. 512, 1913; *Dodsworth, ibid.* vol. xxii, p. 747, 1914.

Cervulus muntjac vaginalis, *Lydekker, Ward's Records of Big Game*, ed. 7, p. 80, 1914.

Typical locality Bengal.

No specimens from the typical locality are available, so that the identification of the sub-Himalayan *ratwa* (from which the definition is taken) with this race is provisional.

Somewhat smaller than *M. m. grandicornis*, with slighter antlers, and the general colour bright chestnut (cinnamon rufous), scarcely paler on flanks, but distinctly so on underparts; hairs pale at base; length of upper series of cheek-teeth about $2\frac{1}{4}$ inches; basicranial length about $7\frac{1}{4}$ inches.

Some of the specimens of which the locality is unknown may belong to one or other of the next two races.

* * * *. Skin, female, mounted. India. *No history.*

25, *a*. Skin. India.
*Bequeathed by Gen. T. Hardwicke*, 1835.

* * * *. Skull, with antlers, and skin. Nepal.
*Presented by B. H. Hodgson, Esq.*

43. 1. 12. 123. Skin. Nepal.
*Presented by B. H. Hodgson, Esq.*, 1843.

43. 1. 26. 13. Skull, with antlers. Nepal. Type of *Cervulus ratwa*. *Same history.*

45. 1. 8. 189 (701, *h*). Skull, with minute antlers. Nepal.
*Same donor*, 1845.

45. 1. 8. 190 (701, *g*). Skull, with small antlers. Nepal.
*Same history.*

45. 1. 8. 191 (701, *i*). Skull, young. Nepal.
*Same history.*

45. 1. 8. 192 (701, *k*). Frontlet and antlers. Nepal.
*Same history.*

45. 1. 8. 193 (701, *j*). Frontlet and antlers. Nepal.
*Same history.*

45. 1. 8. 336. Skin and skull (47. 4. 10. 6), immature female, skull imperfect. Nepal. *Same history.*

701, *d*, *r*, *s*. Three skulls. Nepal. *Same history.*

48. 6. 11. 24. Skull, immature. Sikhim.
*Same donor*, 1848.

48. 6. 11. 25. Skull, young. Sikhim. *Same history.*

56. 5. 6. 63. Skull, female. Darjiling; collected by W. Theobald, Esq. *Presented by Dr. T. Oldham*, 1856.

56. 5. 6. 64. Skull, immature female. Same locality and collector. *Same history.*

58. 6. 24. 11–13. Three skins, immature. Sikhim. *Presented by B. H. Hodgson, Esq.*, 1858.

58. 6. 24. 14. Skin. Sikhim. *Same history.*

58. 6. 25. 15. Skull and skin, young. Sikhim. *Same history.*

58. 6. 24. 182–184. Three skin-covered frontlets, with antlers. Sikhim. *Same history.*

79. 11. 21. 191. Skull, with antlers, and head-skin. Dehra Dun; collected by Capt. J. Hutton. *Transferred from India Museum*, 1879.

79. 11. 21. 192. Skull, imperfect, and head-skin, female. Same locality and collector. *Same history.*

79. 11. 21. 193. Skin, young in spotted coat. Same locality and collector. *Same history.*

91. 8. 7. 45. Skull, imperfect, with large antlers. Berar. Length of upper series of cheek-teeth $2\frac{1}{4}$ inches; the antlers are smaller and their pedicles rather longer than in the type of *M. m. grandicornis* (4. 9. 23. 1). *Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 46. Skull, with antlers. Mussurie. *Same history.*

91. 8. 7. 47. Skull, with antlers. Garo Hills; collected by G. P. Sanderson, Esq. *Same history.*

91. 8. 7. 48. Skull, with antlers. Same locality and collector. *Same history.*

0. 7. 4. 1. Skin, mounted, melanistic phase. Darjiling. *Presented by M. G. Jukes, Esq.*, 1900.

12. 10. 31. 14. Skull, with antlers, which measure $6\frac{1}{2}$ inches in length, with a girth of 3, and a tip-to-tip interval of $3\frac{3}{8}$ inches. *Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

14. 11. 31. 3. Skull and skin. Twinywa, near Pyawbwe; collected by F. E. W. Venning, Esq. *Presented by the Bombay Natural History Society*, 1914.

The place of origin of the two following specimens is unknown, so that they cannot be definitely classed:—

701, *aa*. Skull, with large antlers. From an old skin. *No history.*

701, *f*. Skull, female. *No history.*

## K.—Muntiacus muntjak aureus.

Cervus aureus, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 148, 1827.

Cervus (Stylocerus) aureus, *H. Smith*, *op. cit.* vol. v, p. 320, 1827 (locality wrong).

Stylocerus aureus, *Jardine. Naturalist's Libr., Mamm.* vol. iii, p. 185, 1835.

Cervus albipes, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 294, 1844; *Schinz*, *Synop. Mamm.* vol. ii, p. 549, 1844.

Cervulus aureus, *Jerdon*, *Mamm. India*, p. 264, 1867, partim.

Cervulus tamulicus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 94, 1872, *Hand-List Ruminants Brit. Mus.* p. 165, 1873.

Muntiacus aureus, *Wroughton*, *M.S.* 1914.

Typical locality not definitely known, but some part of Southern India.

Size medium; general colour ochery buff (clay-colour tinged with ochery), darker on middle of back, with the nuchal grizzled area extending behind the shoulders on to the back; under-parts paler; hairs greyish white at base.

Typical locality of *C. tamulicus* Dekhan; *C. albipes* was stated by its describer to be from "Bombay and Poona."

701, *b*. Skull, with antlers in velvet. Dekhan. Type of *C. tamulicus*. *Presented by Col. W. H. Sykes, about* 1842.

## L.—Muntiacus muntjak malabaricus, subsp. n.

Muntiacus malabaricus, *Wroughton*, *M.S.* 1914.

This race is to be attributed to Mr. Wroughton, by whose courtesy the publication of his description has been permitted here.

Typical locality Nagarhol, Coorg, Southern India; the range includes the Kanara and Malabar coast.

"Generally similar to *M. m. aureus*, but the size larger than in either that race or *M. m. vaginalis* and the prevalent colour deep chestnut (between raw sienna and tawny), with

the grizzling extending all over the back and part of the flanks; under-parts drab; hairs white at base."—R. C. W.

13. 8. 22. 133. Skull, with antlers, and skin. Nagarhol, Coorg; collected by G. C. Shortridge, Esq., Feb., 1913. Type. *Presented by the Bombay Natural History Society*, 1913.

### M.—Muntiacus muntjak, subsp.

Typical locality Island of Hainan, China.

The two following specimens indicate a large rufous muntjak apparently allied to the Bornean and Malay races of the present species :—

70. 2. 10. 25–26. Two skins. Hainan; collected by R. Swinhoe, Esq. *Purchased*, 1870.

## II. MUNTIACUS LACRYMANS.

Cervulus lacrymans, *Milne-Edwards, Arch. Mus. Paris*, vol. vii, p. 93, 1871, *Rech. Mamm.* p. 348, pls. lxiii and lxiv, 1874; *Brooke, Proc. Zool. Soc.* 1874, p. 40, 1878, p. 899; *Anderson, Zool. Results Yunnan Exped.* p. 338, 1878; *Lydekker, Horns and Hoofs*, p. 316, 1893, *Deer of All Lands*, p. 208, 1898,* *Game Animals of India, etc.* p. 263, 1907; *Hilzheimer, Abh. Mus. Naturk. Magdeburg*, vol. i, p. 66, 1906; *Ward, Records of Big Game*, ed. 6, p. 81, 1910, ed. 7, p. 81, 1914.

Muntiacus lacrymans, *Allen, Bull. Mus. Harvard Coll.* vol. xl, p. 204, 1912.

Typical locality Sze-chuan, Western China.

Type in Paris Museum.

Smaller (shoulder-height about 19 inches) and yellower than the preceding species, with the whole forehead (exclusive of the black pedicle-streaks), occiput, and backs of ears yellowish brown or yellow; lower part of face varying from rufous to blackish; no dark neck-stripe; general body-colour bright speckled rufous brown, with a tinge of bluish; lachrymal pits of skull smaller than orbits, from which they are separated by a narrow bar, and not occupying entire surface of lachrymal bone; basal length of skull typically about 7 inches,† length of upper series of cheek-teeth not recorded in typical race. Antlers always small.

* *C. lachrymans.*

† *Teste* Brooke.

The following three races are apparently distinguishable:—

A. Head and neck less yellow; size apparently larger *M. l. lacrymans.*
B. Head and neck more yellow; size, at least frequently, smaller.
  *a*. Lower part of face mostly rufous; general colour lighter; size larger..... *M. l. sclateri.*
  *b*. Lower part of face blackish; general colour darker; size smaller..... *M. l. teesdalei.*

## A.—Muntiacus lacrymans lacrymans.

Typical locality Sze-chuan.

Type in Paris Museum.

Head and neck apparently less yellow than in next race and size larger.

No specimen in collection.

## B.—Muntiacus lacrymans sclateri.

Cervulus sclateri, *Swinhoe*, *Proc. Zool. Soc.* 1872, p. 814; *Brooke*, *ibid.* 1874, p. 40; *Gray*, *Hand-List Ruminants Brit. Mus.* p. 165, 1873; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii. p. 173. 1891; *Lydekker*, *Field*, vol. cx, p. 677, 1907, *Proc. Zool. Soc.* 1910, p. 989.

Typical locality mountains near Ningpo, Southern China; abundant in the hills of the An-hwei district.

Apparently distinguished from the typical race by its smaller size and by the more strongly marked contrast between the yellow of the forehead and the rufous or olive of the neck; lower part of face typically rufous; basal length of skull probably about 6¼ inches; length of upper series of cheek-teeth 2 inches.

72. 9. 3. 1. Skull, imperfect, and skin (formerly mounted). Ningpo, Southern China; collected by R. Swinhoe, Esq. Type. Length of upper series of cheek-teeth 2 inches.

*Purchased*, 1872.

72. 9. 3. 3. Skin, formerly mounted, and skeleton, young. Same locality and collector. *Same history.*

7. 9. 19. 1. Head, mounted, subadult. An-hwei (Ngan-hwei) district, Central China.

*Presented by J. H. Teesdale, Esq.*, 1907.

9. 6. 9. 1. Skin, mounted, immature. Same locality. The lower part of the face is darker than in the preceding specimen, perhaps a character of immaturity.

*Same donor*, 1909.

1. 3. 2. 8. Skull, with antlers, and skin. Ningpo.

*Presented by F. W. Styan, Esq.*, 1901.

1. 3. 2. 9. Skin, with imperfect skull in scalp. Foochow, Fokien, South-eastern China. *Same history.*

2. 6. 10. 61. Skull, with antlers, and skin, immature. Chung-yung, southern Hupei. The lower portion of the face is more dusky than in the type and the upper portion of the ears brown—features which may be due to immaturity; the last two milk-molars are still in use. Collected January, 1902. *Same donor*, 1902.

2. 6. 10. 61. Skull, with antlers, and skin of a somewhat older individual. Same locality. The ears are mainly yellow. *Same history.*

5. 10. 27. 1. Skull, imperfect, with antlers. Wan-shan-Chang, China. *Presented by H. Brelich, Esq.*, 1905.

5. 10. 27. 2. Skull, female. Same locality.

*Same history.*

### C.—Muntiacus lacrymans teesdalei, subsp. n.

Typical locality Tatung, Yang-tsi Valley. A small dark-coloured form, retaining the wholly yellow ears, but with the entire lower part of the face blackish brown, nearly like the back; basal length of skull $5\frac{7}{8}$ inches; length of upper series of cheek-teeth $1\frac{7}{8}$ inches.

May represent a distinct species.

10. 6. 16. 1. Skull, with antlers, and skin, of a fully adult animal. Tatung, Yang-tsi Valley. Type.

*Presented by J. H. Teesdale, Esq.*, 1910.

10. 6. 16. 2. Skull, with antlers, of a somewhat younger individual. Same locality. *Same history.*

## III. MUNTIACUS REEVESI.

Cervus reevesii, *Ogilby*, *Proc. Zool. Soc.* 1838, p. 105.

Prox reevesii, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 185, 1846; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 362, 1872, vol. lxxix, pt. 1, p. 60, 1879.

Cervulus reevesii,* *Gray, Knowsley Menagerie*, p. 65, 1850, *Cat. Ungulata Brit. Mus.* p. 220, 1852, *Cat. Ruminants Brit. Mus.* p. 94, 1872, *Hand-List Ruminants Brit. Mus.* p. 165, 1873; *Swinhoe, Proc. Zool. Soc.* 1862, p. 361; *Brooke, ibid.* 1878, p. 899; *Anderson, Zool. Results Yunnan Exped.* p. 338, 1878; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 174, 1891; *Lydekker, Horns and Hoofs*, p. 316, 1893, *Deer of All Lands*, p. 208, 1898, *Proc. Zool. Soc.* 1910, p. 989; *Pocock, Proc. Zool. Soc.* 1910, p. 954; *Aoki, Annot. Zool. Japon.* vol. viii, p. 343, 1913.

Typical locality Canton, Eastern China.

Smaller than the typical form of *M. lacrymans*, the shoulder-height being about 16 inches, the basal skull-length $5\frac{3}{4}$ inches, and the length of the upper series of cheek-teeth $1\frac{7}{8}$ to $1\frac{15}{16}$ inches; skull shorter and wider, with more divergent antlers, and larger lachrymal pits, which occupy the whole surface of the bone, and are larger than the orbits, with which they are in complete contact, not extending in advance of first line of anterior premolars; nasals expanded laterally at junction with maxillæ; nape usually with a distinct black stripe; upper part of forehead cinnamon (pale rufous), and upper part of ears dusky; general colour reddish chestnut, more or less full speckled with yellowish grey; limbs blackish brown; in females most of the backs of the ears and the greater part of the forehead blackish or black.

The range includes Southern China and Formosa.

### A.—Muntiacus reevesi reevesi.

Typical locality Canton, Eastern China.

General characters those of the species; forehead between black pedicle-streaks distinctly rufous; chin and throat white.

50. 11. 22. 12. Skull, imperfect, and skin, female. China. *Purchased (Zoological Society)*, 1850.

53. 8. 29. 44. Skull and skin, female. Canton. *Presented by J. R. Reeves, Esq.*, 1853.

55. 12. 24. 283. Skull, imperfect, and skin. Canton. Type. Length of upper series of cheek-teeth 2 inches. *Same history.*

* Or *reevesi*.

61. 1. 7. 1. Skull and skin, young. Amoy, China; collected by R. Swinhoe, Esq. The first molar is not yet in use. *Purchased*, 1861.

72. 9. 3. 2. Skull and skin, female, in spotted coat. Ningpo; same collector. *Purchased*, 1872.

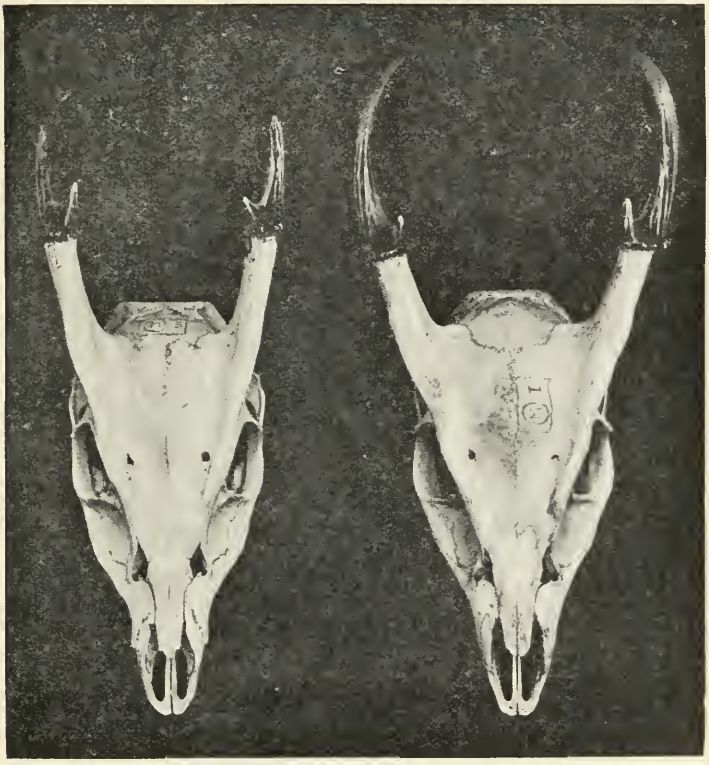


FIG. 5.—SKULL AND ANTLERS OF REEVES'S MUNTJAC (*Muntiacus reevesi*), A, and BRIDGEMAN'S MUNTJAC (*M. sinensis*), B.
From Lydekker, *Proc. Zool. Soc.* 1910.

72. 9. 3. 8. Skeleton, subadult. Same locality and collector. *Same history.*

1524, *a*. Skeleton. Menagerie specimen. *Purchased* (*Zoological Society*).

0. 7. 6. 2. Skull and skin, female. Foochow, Fokien, South-eastern China. *Presented by C. B. Rickett, Esq*, 1900.

0. 7. 6. 3. Skull, with milk-molars and first molar in use, young female. Same locality. *Same history.*

1. 3. 2. 7. Skin, female. Foochow.
*Presented by F. W. Styan, Esq.*, 1901.

1. 3. 2. 10. Skull, imperfect, with much worn cheek-teeth, and skin, female. Ningpo. *Same history.*

1. 3. 2. 11. Skull, imperfect, and skin of a younger female. Same locality. *Same history.*

1. 3. 2. 12. Skull, imperfect, with milk-molars, and skin, female. Same locality. *Same history.*

4. 5. 7. 1. Skin, subadult, mounted. China.
*Presented by the Duke of Bedford, K.G.*, 1904.

## B.—Muntiacus reevesi pingshiangicus.

Cervulus reevesi pingshiangicus, *Hilzheimer*, *Abh. Mus. Naturk. Magdeburg*, vol. i, p. 169, 1906.
Cervulus reevesi, var. *Lydekker*, *Proc. Zool. Soc.* 1910, p. 991.

Typical locality Pingshiang, Central China.

General colour similar to that of typical race, but the forehead between the black lines uniformly leather-brown without a rufous tinge; backs of ears streaked with blackish, in females wholly blackish; chin, throat, and under side of neck yellowish white; under-parts brownish grey.

10. 10. 22. 3. Skull and skin, female, provisionally referred to this race. Feng Luang Shan, An-hwei, Central China. *Presented by Commander the Hon. R. O. B. Bridgeman, R.N.*, 1910.

## C.—Muntiacus reevesi micrurus.

Cervulus micrurus, *Sclater*, *Proc. Zool. Soc.* 1875, p. 421, 1876, p. 696.

Typical, and only, locality Formosa.

Distinctly richer and darker in colour than either of the races from the Chinese mainland. The supposed shortness of the tail, which constituted the grounds for separating the island from the mainland form, turned out to be the result of an individual injury.

62. 12. 24. 3. Skull and skin, subadult, female. Formosa; collected by R. Swinhoe, Esq. *Purchased*, 1862.

70. 2. 10. 82, 83, and 85. Three frontlets, with antlers. Formosa; same collector. *Purchased*, 1870.

93. 12. 5. 7. Skull and skin. Formosa; collected by Mr. P. A. Holst. A menagerie specimen.

*Presented by H. Seebohm, Esq.*, 1893.

93. 12. 5. 8. Skull and skin, young. Same locality and collector. *Same history.*

94. 11. 22. 7. Skull and skin, female. Tongapo, southern Formosa; same collector. *Purchased*, 1894.

8. 4. 1. 55. Skull, imperfect, and skin. Central Formosa; collected by Mr. A. Owston. *Purchased.*

8. 4. 1. 57. Skull, imperfect posteriorly, with antlers, and skin. Banhora, central Formosa; same collector.

*Same history.*

## IV. MUNTIACUS SINENSIS.

Cervulus sinensis, *Hilzheimer*, *Zool. Anz.* vol. xxix, p. 297, 1905, *Abh. Mus. Naturk. Magdeburg*, vol. i, p. 165, pl. ii, fig. 1, 1906.

Cervulus bridgemani, *Lydekker*, *Proc. Zool. Soc.* 1910, p. 989, *Abstr.* p. 38; *Ward*, *Records of Big Game*, ed. 6, p. 82, 1910, ed. 7, p. 82, 1914.

Typical locality, probably the Hwai Mountains (Hwei-Yas Shan), An-hwei (Ngan-hwei) district of Central China; the type specimen was a captive individual at Kiu-kiang, near Hankau, to the south of the Yang-tsi.

Type in Magdeburg Museum.

Allied to the preceding species, but larger and darker; the shoulder-height being about 19 inches, and the general colour blackish brown mingled with yellow, owing to the presence of yellow subterminal rings to the otherwise dark hairs of the middle of the back and rump; in females the annulated area includes the flanks; whole forehead, occiput, and basal two-thirds of backs of ears leather-yellow in males, blackish in females; black frontal streaks uniting into a patch behind ears and continued posteriorly as the nuchal stripe. Antler-pedicles, at least frequently, more divergent than in *M. reevesi*, and nasals without lateral expansion at first contact with maxillæ; lachrymal pits as large as or rather larger than orbits, with which they are in contact only for a very small space, extending anteriorly some

distance in advance of the line of the anterior upper molar; basal length of skull about $5\frac{1}{4}$ inches (157 mm.), longer diameter of orbit $1\frac{5}{8}$ (32 mm.), of lachrymal pit $1\frac{1}{4}$ (36 mm.), length of upper tooth-row $1\frac{7}{8}$ inches (48·5 mm.).

This species (at all events as represented by *M. bridgemani*) lives at high elevations, descending to lower levels only at periods of extreme cold in mid-winter.

10. 5. 26. 2. Skull, with antlers, head-skin mounted, and body-skin. Hwai Mountains, An-hwei district. *Presented by Commander the Hon. R. O. B. Bridgeman, R.N.*, 1910.

10. 5. 26. 3. Skin, mounted. Same locality. Type of *C. bridgemani*. *Same history*.

10. 10. 22. 2. Skull, female. Tai Kung Shan, An-hwei. *Same history*.

## V. MUNTIACUS FEÆ.

Cervulus feæ, *Thomas and Doria, Ann. Mus. Genova*, ser. 2, vol. vii, p. 92, 1889; *Blanford, Fauna Brit. India, Mamm.* p. 534, 1891; *Thomas, Ann. Mus. Genova*, vol. x, p. 945, pl. x, 1892; *Lydekker, Horns and Hoofs*, p. 315, 1893, *Deer of All Lands*, p. 209, pl. xvi, fig. 1, 1898, *Game Animals of India, etc.* p. 263, 1907; *Gairdner, J. Siam Nat. Hist. Soc.* vol. i, p. 115, 1914.

Typical locality mountains south-east of Muleyit, Tenasserim.

Type in Genoa Museum.

Differs from all the preceding species by the absence of frontal glands, the black middle line of upper surface of the tail, and the sepia-brown general colour; the tail being relatively short, the face-markings distinct, and the lower part of fronts of hind-legs with a white line. In both this and the next species the young are probably unspotted. Size approximately the same as in the Indian race of the type species. The following is an abbreviation of the original description:—

General colour uniformly dark brown, with centre of crown, pedicles of antlers, occiput, and region round bases of the ears bright yellow; a black line running up the inner side of each pedicle; neck uniformly brown; fore-legs brown superiorly, darkening to black on the metacarpals, with the

terminal inch next the hoof white all round, and a line of scattered white hairs running up fronts to knees; hind-legs similarly coloured, but with a distinct white line on fronts; tail short, black above, white below and at sides, the two colours sharply contrasted; under-parts brown, mixed with whitish on chin and inner surfaces of limbs.

14. 8. 22. 32. Skin of rump and tail. Tenasserim border of Siam. The sole remnant of an animal killed by a leopard and eaten by coolies.

*Presented by K. G. Gairdner, Esq.*, 1914.

## VI. MUNTIACUS CRINIFRONS.

Cervulus crinifrons, *Sclater, Proc. Zool. Soc.* 1885, p. 1, pl. i; *Styan, ibid.* 1886, p. 267; *Lydekker, Horns and Hoofs*, p. 317, 1893, *Deer of All Lands*, p. 210, pl. xvi, fig. 2, 1898; *Ward, Records of Big Game*, ed. 6, p. 82, 1910, ed. 7, p. 82, 1914.

Typical locality near Ningpo, Eastern China.

Distinguished from all other members of the group by its large size (shoulder-height from 24½ to, probably, 25 inches), and the tuft of long hairs on the forehead and crown of the head, which conceals the antler-pedicles and obscures the markings of this area; hair longer and coarser, ears shorter, more rounded, and more thickly haired on backs, tail much longer (9 inches), and lateral hoofs better developed than in any of the chestnut-coloured species. General colour dark sepia-brown, with a purple tinge, and the back finely speckled with rufous; head-crest, ears, forehead, and cheeks bright orange-chestnut; inner sides of thighs and sides and lower surface of tail white; upper surface of tail and a stripe extending thence on to rump black.

91. 3. 4. 1. Skin, mounted, and skeleton. Ningpo, Southern China; collected by A. Michie, Esq., who presented the animal, when alive, to the Zoological Society. Type.

*Purchased*, 1891.

## III. Genus ELAPHODUS.

Elaphodus, *Milne-Edwards*, *Arch. Mus. Paris*, vol. vii, p. 93, 1871, *Rech. Mamm.* p. 353, 1874; *Garrod*, *Proc. Zool. Soc.* 1876, p. 757; *Brooke*, *ibid.* 1878, p. 899; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 28, 1881; *Lydekker*, *Deer of All Lands*, p. 212, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 955.

Lophotragus, *Swinhoe*, *Proc. Zool. Soc.* 1874, p. 452.

Nearly allied to *Muntiacus*, but the antlers so small that they scarcely project from the long tuft of hair on the crown of the head, and their long supporting pedicles diverging inferiorly, and not sending down long rib-like ridges on to frontals; no frontal glands; upper canines not everted at tips; hair coarse and pithy; ears broad, rounded, and thickly haired; tail moderately long; lateral hoofs present. The young are spotted along the middle line of the back. Tarsal bones as in *Muntiacus*.

The genus, which is evidently less specialised than *Muntiacus*, is restricted to China.

### ELAPHODUS CEPHALOPHUS.

Elaphodus cephalophus, *Milne-Edwards*, *Arch. Mus. Paris*, vol. vii, p. 93, 1871, *Rech. Mamm.* p. 353, pls. lxv–lxvii, 1874; *Garrod*, *Proc. Zool. Soc.* 1876, p. 757; *Brooke*, *ibid.* 1878, p. 899; *Lydekker*, *Horns and Hoofs*, p. 313, 1893, *Deer of All Lands*, p. 213, 1898, *Proc. Zool. Soc.* 1904, vol. ii, p. 166; *Pocock*, *Proc. Zool. Soc.* 1910, p. 955; *Allen*, *Bull. Mus. Harvard Coll.* vol. xl, p. 203, 1912.

The type and only species.

Typical locality Sze-chuan, Western China.

Type in Paris Museum.

Size approximately the same as in the Indian Muntjac, the shoulder-height being from about 22 to 23 inches. General colour typically deep chocolate-brown, the hairs on head and neck having a narrow white ring near the tip which is wanting in those of the body behind the shoulder, hair of crest forming a nearly black horse-shoe on forehead, bordered by a grey line above each eye; ears whitish internally, with a larger or smaller amount of pure white on

both surfaces of the tips; under surface and sides of tail, and inner sides of buttocks and thighs white.

The races are distinguishable as follows:—

A. Skull longer and narrower.
  *a*. White area on ear-tips smaller.
    *a'*. Size larger; much white on tail ..... *E. c. cephalophus.*
    *b'*. Size smaller; less white on tail ..... *E. c. michianus.*
  *b*. White area on ear-tips larger ..... *E. c. fociensis.*
B. Skull shorter and broader, with differently shaped lachrymal pits ..... *E. c. ichangensis.*

Fig. 6.—Head of Ningpo Tufted Deer (*Elaphodus cephalophus michianus*).
From Garrod, *Proc. Zool. Soc.* 1876.

## A.—Elaphodus cephalophus cephalophus.

Typical locality Sze-chuan.

Size large; general colour chocolate-brown, with the tail mainly white above; skull elongated, with long nasals, and the long axis of the lachrymal pits (which form irregular ovals) nearly coincident with that of orbits. Basicranial length in subadult male 7 inches, in adult female 7¼ inches:

length of nasals in former $2\frac{9}{16}$, in latter $2\frac{8}{16}$ inches; length of upper tooth-row in former $2\frac{1}{2}$, in latter $2\frac{1}{4}$ inches.

92. 7. 31. 1. Skull and skin, female. Eastern Tibet, near Sze-chuan border, at an elevation of 15,000 feet; collected by Dr. W. G. Thorold. The cheek-teeth are well worn; the infraorbital bar of the skull is deep, as in fig. 7.

*Purchased*, 1892.

11. 9. 8. 44. Skull, with antlers, and skin, subadult. Wen-chwan-hsien, Si-ho Valley, western Sze-chuan; collected by M. P. Anderson, Esq. The milk-molars are still in use, and the last molar is not fully protruded. The infraorbital bar of the skull is relatively narrow, thereby indicating that the relative depth of this element is of no taxonomic importance.

*Presented by the Duke of Bedford, K.G.*, 1911.

## B.—Elaphodus cephalophus michianus.

Lophotragus michianus, *Swinhoe*, *Proc. Zool. Soc.* 1874. p. 452; *Garrod*, *ibid.* 1876, p. 757, pl. lxxvi.

Elaphodus michianus, *Brooke*, *Proc. Zool. Soc.* 1878, p. 900; *Styan*, *ibid.* 1886, 268; *Lydekker*, *Horns and Hoofs*, p. 313, 1893, *Deer of All Lands*. p. 214, pl. xvii, fig. 1, 1898, *Proc. Zool. Soc.* 1904, vol. ii, p. 166.

Elaphodus cephalophus michianus. *Pocock*, *Proc. Zool. Soc.* 1910, p. 956.

Type of *Lophotragus*.

Typical locality near Ningpo, Che-kiang, Eastern China.

Smaller than the last, and rather lighter in colour, with less white on the tail, of which nearly the whole upper surface is frequently dark; skull (fig. 7) of the same general type, with somewhat shorter nasals, and the lachrymal pits forming narrower but large irregular ovals, in which the longer axis is not far removed from that of the orbits. Basal length of skull about $6\frac{1}{2}$ inches; length of nasals $2\frac{1}{4}$; length of upper series of cheek-teeth $2\frac{3}{8}$ inches.

This race inhabits reed-brakes in the water-courses of the Ningpo district.

78. 11. 14. 3 (1699, *a*). Skeleton, mounted. Ningpo; collected by A. H. Everett, Esq. Skull shown in fig. 7.

*Purchased* (*Gerrard*), 1878.

78. 11. 14. 4 (1699, *b*). Skull and skin (formerly mounted), immature. Same locality and collector. *Same history.*

78. 11. 14. 5 (1699, *c*). Skeleton, mounted, and skin, female. Same locality and collector. *Same history.*

86. 10. 28. 7. Skin, mounted. 100 miles S.W. of Ningpo; collected by F. W. Styan, Esq. *Purchased*, 1886.

86. 10. 28. 8. Skin, female, mounted. Same locality and collector. *Same history.*

86. 10. 28. 9. Skin, young, mounted. Same locality and collector. *Same history.*

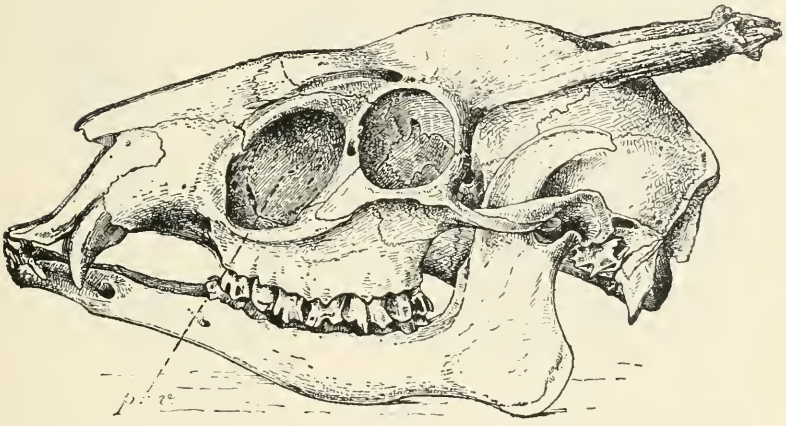

Fig. 7.—Side View of Skull of Ningpo Tufted Deer (*Elaphodus cephalophus michianus*); *pr. v.* lachrymal pit.

From Lydekker, *Proc. Zool. Soc.* 1904.

1. 3. 2. 13. Skull and skin, immature. Ningpo. Milk-molars still in use. *Presented by F. W. Styan, Esq.*, 1901.

1. 3. 2. 14. Skull and skin, female. Same locality. *Same history.*

1. 3. 2. 15. Skull, imperfect, and skin, immature female. Same locality. *Same history.*

1. 3. 2. 16. Skull and skin, young. Same locality. *Same history.*

2. 6. 10. 60. Skull and skin, immature. Che-kiang, China. The milk-molars are still in use, and the last upper molar is not yet protruded. *Same donor*, 1902.

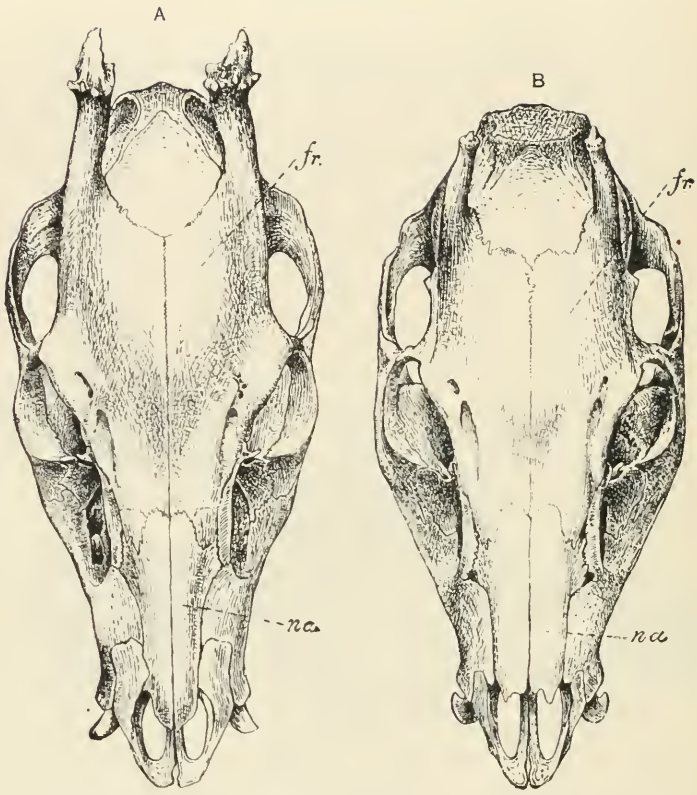


FIG. 8.—FRONT VIEW OF SKULLS OF NINGPO (A), AND ICHANG TUFTED DEER (B) (*Elaphodus cephalophus michianus* and *E. c. ichangensis*). *fr.* frontal; *na.* nasals.

From Lydekker, *Proc. Zool. Soc.* 1904.

## C.—Elaphodus cephalophus fociensis.

Elaphodus michianus fociensis, *Lydekker*, *Proc. Zool. Soc.* 1904, vol. iv, p. 169.

Typical locality Fing-ling, Fo-kien, South-east China.

Rather larger than *E. c. michianus* and apparently a little darker, with much more white on both sides of upper part of ears; tail unknown; skull (female) with less elevation of hind frontal region, and a greater expansion and flattening of the platform formed by the base of the lachrymal and the anterior zygomatic root. Basal skull-length $6\frac{3}{4}$ inches;

length of nasals $2\frac{1}{2}$, length of upper series of cheek-teeth $2\frac{5}{16}$ inches.

98. 3. 7. 18. Skull and skin, female. Fing-ling, Fo-kien. Type. *Presented by C. B. Rickett, Esq.*, 1898.

## D.—Elaphodus cephalophus ichangensis.

Elaphodus ichangensis, *Lydekker*, *Proc. Zool. Soc.* 1904, vol. ii, p. 169. *Abstr*, *P.Z.S.* 1904, p. 10.

Typical locality Ichang, Hu-pe, Central China.

Apparently of the same approximate size as *E. c. michianus*, but with a shorter and broader type of skull, in

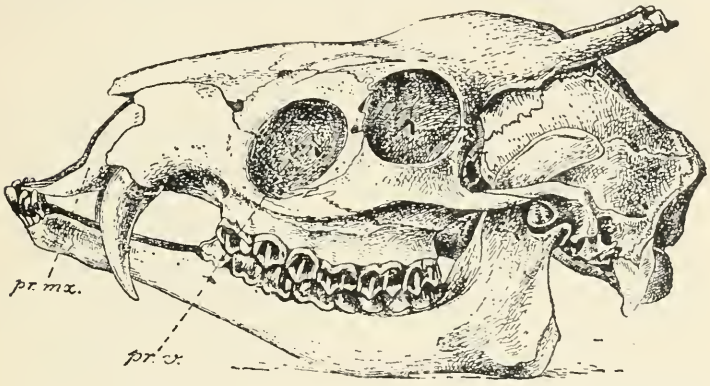


Fig. 9.—Side View of Skull of Ichang Tufted Deer (*Elaphodus cephalophus ichangensis*), *pr. mx.* premaxilla; *pr. v.* lachrymal pit.
From Lydekker, *Proc. Zool. Soc.* 1904.

which the basal length is only $6\frac{3}{8}$ inches, against $7\frac{1}{4}$ inches in the typical race; nasals (fig. 8, B) relatively short, and the lachrymal pits (fig. 9) forming more regular, smaller, and deeper ovals, of which the longer axis is more oblique to that of the orbits than in any of the other races; * general colour dark brown, passing into blackish on the limbs; tail wholly white at tip, with only the basal two-thirds of the upper surface dark. Length of nasals $2\frac{1}{8}$ inches; length of upper series of cheek-teeth $2\frac{5}{16}$ inches.

* Certain other cranial characters given in the original description appear to be dependent on age.

Although this form appears to be the most distinct of all the local forms from the typical *E. cephalophus*, it is perhaps best regarded as a race rather than a species. Unlike *E. c. michianus*, it is a mountain animal.

1. 3. 2. 17. Skull (fig. 8, B, and fig. 9), and skin. Ichang. Type. The molars are rather more worn than in *E. c. cephalophus*, No. 11. 9. 8. 44.

*Presented by F. W. Styan, Esq.*, 1901.

## IV. Genus DAMA.

Dama, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 84, vol. v. p. 306, 1827; *Lydekker, Deer of All Lands*, p. 125, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 950; *Miller*, *Cat. Mamm. West. Europe*, p. 970, 1912.

Platyceros, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 347, 1844.

Dactyloceros, *Wagner*, *op. cit.* vol. v, p. 352, 1855.

Machlis, *Zittel* (ex *Kaup* ?), *Handbuch Palæont.* vol. iv, p. 402, 1893.

Palmatus (= "Palmati," *Giebel*, *Säugethiere*, ed. 2, p. 351, 1859), in *Lydekker's Deer of All Lands*, p. 125, 1828; *Elliot*, *Cat. Mamm. Field Mus.* (*Zool. Pub. Field Mus.* vol. viii) p. 44, 1907.

In this and the two following genera the structure of the remnant of the lateral metacarpals is the same as in *Muntiacus* and *Elaphodus* (plesiometacarpalian type), but the antlers, which diverge from the middle line of the skull at angles of about 45 degrees, are large, with a true basal tine, and are supported on relatively short pedicles, which do not form ridges on the frontals, the upper canines of the stags, when present, are not tusk-like, the lachrymal vacuities of the skull are larger than in the preceding group, the phalanges of the lateral digits are retained (instead of being aborted), and the outer cuneiform bone of the tarsus is not fused with the naviculo-cuboid, as it is in *Muntiacus* and *Elaphodus*. Face-glands are present; in the skull the vomer is low behind, and does not divide the posterior nostrils; and there is a large muffle. *Dama* includes: Medium-sized deer, in which the antlers are normally without a second (bez) tine, but with a third (trez) tine, above which the beam is distinctly, although narrowly, palmated, with snags on the hind-border; coat spotted in summer, uniformly coloured in winter, with a black-bordered white area on the buttocks, in

the region of the rather long tail; head short and broad, with somewhat small but deep face-glands, and the bare part of the muzzle much as in *Cervus* (*infra*); head short and broad; hind-hoofs united only at the "heels"* by a close fold of skin, with the foot-gland forming a long and deep hair-lined interdigital cleft (as in *Muntiacus*), and a moderately deep cleft on front of fore-pasterns; upper canines wanting (fig. 10), cheek-teeth very short-crowned

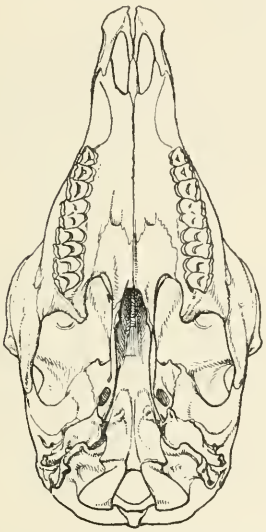

FIG. 10. — PALATAL ASPECT OF SKULL OF FALLOW DEER (*Dama dama*). ¼ nat size.

From Miller, *Cat. Mamm. Western Europe.*

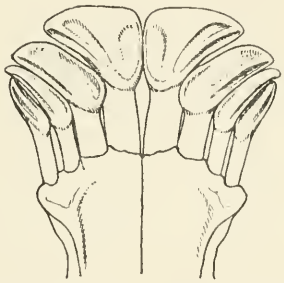

FIG. 11.—LOWER FRONT TEETH OF FALLOW DEER (*Dama dama*). nat. size.

From Miller, *Cat. Mamm. Western Europe.*

and broad, and a marked difference in the size of the crowns of the three pairs of lower incisors (fig. 11); orbits relatively large; young spotted. Other characters as in *Cervus*, *infra*, p. 40.

The original distributional area appears to have been restricted to the Mediterranean countries and Persia; but the typical species has been introduced into Western and Central Europe, where it exists in a semi-domesticated

* For explanation of this term see vol. ii, p. 172.

condition as far north as the British Islands and the south of Sweden.

Fallow deer were regarded by Garrod as near akin to the Sika group of *Cervus;* but Pocock points out that they differ from all other deer, with the exception of the muntjak group, by the deep clefts between the hoofs, and are therefore entitled to form a generic group by themselves.

## I. DAMA DAMA.

Cervus dama, *Linn. Syst. Nat.* ed. 10, vol. i, p. 67, 1758, ed. 12, vol. i, p. 93, 1766; *Kerr, Linn.'s Anim. Kingdom*, p. 298, 1793; *F. Cuvier, Hist. Nat. Mamm.* vol. i, pls. 104–106, 1811; *Cuvier, Ossemens Fossiles*, ed. 2, vol. iv, p. 29, 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 84, 1827; *Fischer, Synop. Mamm.* p. 448, 1829; *Jenyns, Brit. Vert. Anim.* p. 38, 1835; *Bell, Brit. Quadrupeds*, p. 402, 1837, ed. 2, p. 358, 1874; *Keyserling and Blasius, Wirbelth. Europ.* p. 26, 1840; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 169, 1842; *Owen, Brit. Foss. Mamm. and Birds*, p. 483, 1846; *Blasius. Säugeth. Deutschl.* p. 453, 1857; *Giebel, Säugethiere*, ed. 2, p. 351, 1859; *Sclater, Nature*, vol. xi, p. 71, 1874; *Brooke, ibid.* vol. xi, p. 210, 1875, *Proc. Zool. Soc.* 1878, p. 913; *Dawkins, Nature*, vol. xi, pp. 112 and 226, 1875; *Busk, Trans. Zool. Soc.* vol. x, p. 114, 1877; *Danford and Alston, Proc. Zool. Soc.* 1877, p. 276, 1880, p, 54; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 299, 1884; *Woodward and Sherborn, Cat. Brit. Foss. Vert.* p. 330, 1890; *Flower and Lydekker, Study of Mammals*, p. 323, 1891; *Lydekker, Horns and Hoofs*, p. 311, 1893, *British Mammals*, p. 246, 1895, *Deer of All Lands*, p. 127, 1898, *Great and Small Game of Europe, etc.* p. 241, 1901; *Fowler, Proc. Zool. Soc.* 1894, p. 485; *Millais, Mamm. Gt. Britain*, vol. iii, p. 137, 1906; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 44, 1907; *Winge, Danmarks Fauna, Pattedyr*, p. 173, 1908; *Joleaud, Rev. Africaine*, vol. iv, p. 16, 1913.

Cervus platyceros, *Cuvier, Tabl. Élém. Hist. Nat.* p. 160, 1798.

Cervus mauricus, *F. Cuvier, Bull. Soc. Philom.* 1816, p. 72; *Blainville, Journ. Phys.* vol. xciv, p. 261, 1822.

Cervus daima, *F. Cuvier, Hist. Nat. Mamm.* vol. i, pls. 104–107, 1819.

Cervus (Dama) dama, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 306, 1827; *Lydekker, Game Animals of Africa*, p. 386, 1908; *Ward, Records of Big Game*, ed. 6, p. 54, 1910; *Joleaud, Rev. Africaine*, vol. iv, p. 3, 1913.

Cervus dama, β. leucæthiops, *J. B. Fischer, Synop. Mamm.* p. 448, 1829.

Cervus dama, γ. maura, *Fischer, loc. cit.* 1829.

Dama platyceros, *Fitzinger, Beitr. Landesk. Österreichs*, vol. i, p. 317, 1832, *Sitzber. k. Ak. Wiss. Wien*, vol. lxvii, pt. 1, p. 350, 1873, vol. lxix, pt. 1, p. 547, 1874; *Reichenbach, Säugethiere*, vol. iii, p. 16, 1845.

Dama vulgaris, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 152, pls. vii, 1835; *Gray, List Mamm. Brit. Mus.* p. 181, 1843, *Proc. Zool. Soc.* 1850, p. 229, *Cat. Ungulata Brit. Mus.* p. 200, 1852, *Cat. Ruminants Brit. Mus.* p. 74, 1872, *Hand-List Ruminants Brit. Mus.* p. 142, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 264, 1862; *Loche, Exped. Algérie, Mamm.* p. 64, 1867; *Garrod, Proc. Zool. Soc.* 1877, p. 18; *Sclater, List Anim. Zool. Gardens*, p. 181, 1886; *Lydekker, Ward's Records of Big Game*, ed. 7, p. 74, 1914.

Cervus (Platyceros) dama, *Wagner, Schreber's Säugthiere. Suppl.* vol. iv, p. 347, 1844.

Cervus (Dactyloceros) dama, *Wagner, op. cit.* vol. v, p. 352, 1855.

Dama platyceros, niger, *Fitzinger, Sitzber. k. Ak. Wiss. Wien.* vol. lxix, pt. 1, p. 553, 1874.

Dama platyceros, varius, *Fitzinger, op. cit.* p. 555, 1874.

Dama platyceros, albus, *Fitzinger, loc. cit.* 1874.

Dama dama, *Lataste, Actes Soc. Linn. Bordeaux*, vol. xxxix, p. 288, 1885; *Trouessart, Faune Mamm. Europe*, p. 229, 1910; *Pocock, Proc. Zool. Soc.* 1910, p. 950; *Miller, Cat. Mamm. West. Europe*, p. 970, 1912; *Cabrera, Cat. Met. Mam. Mus. Madrid*, p. 130, 1912.

Fallow Deer; Daim.

The type species.

Typical locality Sweden (introduced).

The locality of *C. mauricus*, = *maura*, Fischer, = *niger*, Fitzinger, is unknown. The names *leucæthiops*, = *albus*, and *varius* pertain to the introduced German breeds of the species.

Height at shoulder from about 3 feet to 3 feet 2 inches; antlers well palmated and directed largely upwards, with the brow- and trez-tines simple, and the front edge normally devoid of snags, which are, however, numerous on the summit and hind margin of the palmated portion; general colour in summer brilliant fawn, with large whitish spots irregularly distributed over the back, upper part of the sides, and haunches, this spotted region being bounded inferiorly on the sides and posteriorly on the haunches by undefined white lines; a blackish line running down the middle of the back and tail; a white area, bordered above by black on the buttocks below the tail, and the under side of the tail, under-parts, inner surfaces of upper portions of limbs, and inner sides of ears white or whitish; in winter the colour of the upper parts uniformly greyish fawn.

Owing to long domestication, the fallow deer of the British parks frequently display great variation from this original type of coloration, and a uniformly dark brown

breed has been long established, while white or whitish varieties are far from uncommon.

Good antlers measure from 25 to 37 inches along the front outer curve, with a basal girth of from 4 to $5\frac{1}{4}$ inches, and a tip-to-tip interval of from 12 to $30\frac{1}{2}$ inches. A bez-tine may occasionally be developed on the antlers, and another abnormality is the presence of an additional tine on the front edge immediately above the third tine. The antlers make their first appearance in the second year, when they are in the form of simple snags, the stags being then known as prickets. In the third year the brow- and bez-tines show themselves, while the extremity of the beam becomes palmated. In the succeeding year the palmation increases, with strongly marked serrations on the hind border; and in the fifth season the antlers have attained nearly their full dimensions, although the palmation and its posterior snags are not completely developed till the succeeding season. The antlers are shed somewhat earlier in spring than those of red deer.

The distributional area of the species is co-extensive with that of the genus, exclusive of Persia. Wild fallow deer inhabit a small area at the south-west end of the Sea of Marmora and the whole south coast of Asia Minor as far as Adana, inclusive of the Taurus range. In western-north Africa they are very rare and local.

693, *a*, *b*, *d*. Three frontlets, with antlers. England. *No history.*

693, *k*. Skull, female. England. *No history.*

43. 12. 29. 4. Skin, mounted. Italy. *Purchased* (*Lefèbre*), 1843.

46. 10. 23. 11. Skin, mounted. England. *Purchased* (*Baker*), 1846.

50. 2. 5. 1–46. Forty-six antlers. New Forest, Hampshire. *Presented by Mrs. Smyth*, 1850.

50. 11. 13. 15. Skin, with antlers. England. *Purchased*, 1850.

* * * *. Skin, mounted. England. *Purchased* (*Leadbeater*).

67. 4. 12. 234–235. Two skulls, with antlers. Continental. *Lidth de Jeude Collection, purchased*, 1867.

67. 4. 12. 236 and 241. Two skulls, female. Continental. *Same history.*

88. 6. 12. 3. Frontlet and antlers. Nannan Park, Merionethshire. *Presented by J. E. Harting, Esq.*, 1888.

96. 9. 24. 1. Skin, mounted. Woburn Abbey, Bedfordshire. *Presented by the Duke of Bedford, K.G.*, 1896.

98. 10. 18. 1. Skin, mounted. Tring Park, Hertfordshire. *Presented by the Hon. Walter Rothschild*, 1898.

## II. DAMA MESOPOTAMICA.

Cervus (Dama) mesopotamicus, *Brooke*, *Proc. Zool. Soc.* 1875, p. 265, 1876, p. 298; *Ward*, *Records of Big Game*, ed. 6, p. 56, 1910.

Dama mesopotamica, *Garrod*, *Proc. Zool. Soc.* 1877, p. 18; *Sclater*, *List Anim. Zool. Gardens*, p. 171, 1883; *Lydekker*, *Ward's Records of Big Game*, ed. 7, p. 76, 1914.

Cervus mesopotamicus, *Brooke*, *Proc. Zool. Soc.* 1878, p. 914; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxxix, pt. 1, p. 62, 1879; *Lydekker*, *Horns and Hoofs*, p. 311, 1893, *Deer of All Lands*, p. 132, 1898, *Great and Small Game of Europe, etc.* p. 244, 1901.

Cervus dama mesopotamiæ, *Trouessart*, *Cans. Sci. Soc. Zool. France*, vol. i, p. 405, 1905; *Joleaud*, *Rev. Africaine*, vol. iv, p. 16, 1913.

Persian Fallow Deer.

Typical locality Luristan Province of Persia.

Larger than *D. dama;* the colour much brighter (as bright as in the Indian chital), with the row of elongated whitish spots running on each side of the dark median line of the back in the former coalescing into a continuous band, and the black on the upper surface of the tail narrower and confined to the root; antlers (fig. 12) of a totally different type, being somewhat expanded at the origin of the trez-tine, which is large and situated close to the very short brow-tine, but at the summit only somewhat flattened, and breaking up at the crown and summit of the hind border into four, five, or more snags.

93. 10. 17. 5. Head, mounted (fig. 12), and body-skin. Luristan. *Presented by Mr. Heinicher*, 1893.

95. 4. 7. 1. Single antler. Shustu, Luristan. From Sir Victor Brooke's collection. Co-type.
*Presented by Sir Douglas Brooke, Bart.*, 1895.

97. 11. 11. 1–2. Skull and single antler. Khuzistan, Persia. Same collection. Co-type. *Same donor*, 1897.

Fig. 12.—Head of Persian Fallow Deer (*Dama mesopotamica*).

97. 11. 11. 3. Single antler. Same locality and collector. *Same history.*

## V. Genus CERVUS.

Cervus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 66, 1758, ed. 12, vol. i, p. 92, 1766; *Brooke, Proc. Zool. Soc.* 1878, p. 911; *Blanford, Fauna Brit. India, Mamm.* p. 534, 1891; *Lydekker, Deer of All Lands*, p. 61, 1898; *Pocock, Proc. Zool. Soc.* 1910, p. 940; *Miller, Cat. Mamm. West. Europe*, p. 963, 1912.

The range of this, the typical, genus includes the north temperate zones of both hemispheres, extending westward in the Old World to the Atlantic coast of Norway, the British Islands, and north-western Africa.

Large or medium-sized, or small deer, with subcylindrical or somewhat flattened antlers, furnished with a true brow-tine above the burr, and at least two other tines; muzzle with a large bare muffle; tail medium or short; coat more or less uniformly coloured or spotted; main hoofs long and pointed, the hind pair united almost throughout their basal length by a deep interungual membrane; no specialised gland or deep interdigital cleft on front of fore-pasterns nor on hind-pasterns except in the subgenera *Hyelaphus* and *Axis;* skull, at least typically, longer and narrower than in *Dama*, with smaller orbits; cheek-teeth moderately short-crowned and wide; crowns of lower incisors varying some-

Fig. 13.—Lower Front Teeth of Red Deer (*Cervus elaphus*).
From Miller, *Cat. Mamm. Western Europe.*

what in size, at least in typical groups (fig. 13); upper canines usually present, young generally spotted. For other characters, common to the allied genera, see *Dama* (p. 40).

Considerable diversity of view obtains with regard to the limits of the genus; Brooke and Blanford included in it the sikine, rucervine, rusine, and axine groups, together with *Dama*, while Miller restricts it to the typical elaphine group. Pocock, on the other hand, includes the sikine and rucervine, but excludes the rusine and axine groups, as well as *Dama*. In the present volume all these groups, except *Dama*, are included. The genus, in this sense, has a range in the Old World nearly co-extensive with that of the family; but in the New World does not descend south of Mexico.

It may be divided into the following subgenera:—

A. A specialised gland, forming a moderately deep cleft on front of hind-pasterns; upper canines often wanting. Antlers 3-tined; tail long.
  *a*. Build taller and size larger; gland-cleft on hind-pasterns without long hairs; upper canines present or absent; coat spotted at all seasons ..... *Axis.*
  *b*. Build lower and size smaller; gland-cleft on hind-pasterns lined with long hairs; upper canines wanting; coat spotted only in summer, or uniform *Hyelaphus.*

B. Typically no specialised gland or deep cleft on front of hind-pasterns; upper canines usually present.
  *a*. Muffle extending some distance below nostrils; antlers normally 3-tined; tail relatively long and bushy; coat usually uniform (spotted in *C. alfredi*) ..... *Rusa.*
  *b*. Muffle extending but slightly below nostrils.
    *a'*. Tail longer; coat fully spotted, at least in winter; antlers usually 4-tined, without a bez *Sika.*
    *b'*. Tail short; coat wholly or mainly unspotted.
      *a''*. Antlers lacking bez and third tines, typically forked dichotomously, with at least 4 tines; no light rump-patch ..... *Rucervus.*
      *b''*. Antlers usually 5-tined, including a bez; a light rump-patch or area on back of hams... *Cervus.*

## 1. Subgenus **AXIS.**

Axis, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 312, 1827; *Gray*, *Cat. Ruminants Brit. Mus.* p. 79, 1872; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 44, 1881; *Pocock*, *Proc. Zool. Soc.* 1910, pp. 948 and 971.

Melanaxis, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 47, 1888.

Represented by a medium-sized species, with long, 3-tined antlers, in which the brow-tine forms a right angle with the beam, and a gland on the front of the hind-pasterns contained in a moderately deep cleft, which is not lined with long hairs; metatarsal gland bare and overlapped by a row of marginal hairs: coat short and spotted at all seasons, not forming a mane on neck; ears and face-glands moderate; muffle extending some distance below nostrils; tail long and slender; upper canines generally wanting; auditory bullæ moderate.

In the presence of a gland-bearing cleft on the front of the hind-pasterns (to say nothing of the spotted coat and the general absence of upper canines) this subgenus resembles

*Dama*, from which, however, it differs in the characters of the antlers, the absence of clefts on the front-pasterns, and the fuller union of the hind-hoofs by means of an interungual web.

The range is restricted to Peninsular India and Ceylon.

## I. CERVUS (AXIS) AXIS.

Cervus axis, *Erxleben, Syst. Regn. Anim.* p. 312, 1777; *F. Cuvier, Hist. Nat. Mamm.* vol. i, pls. 102 and 103, 1819; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 117, 1827; *J. B. Fischer, Synop. Mamm.* p. 451, 1829; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 172, 1842; *Garrod, Proc. Zool. Soc.* 1877, p. 17; *Brooke, ibid.* 1878, p. 906; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 203, 1884; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 181, 1891; *Blanford, Fauna Brit. India, Mamm.* p. 546, 1891; *Lydekker, Horns and Hoofs*, p. 289, 1893, *Deer of All Lands*, p. 179, pl. xiii, 1898, *Great and Small Game of India, etc.* p. 220, 1900, *Game Animals of India, etc.* p. 233, 1907; *Nitsche, Studien über Hirsche*, p. 94, 1898; *Bentham, Asiat. Horns and Antlers Ind. Mus.* p. 80, 1908; *Ward, Records of Big Game*, ed. 6, p. 68, 1910.

Cervus (Axis) axis, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 312, 1827; *Lydekker, Cat. Hume Bequest Brit. Mus.* p. 38, 1913, *Ward's Records of Big Game*, ed. 7, p. 70, 1914.

Cervus nudipalpebra, *Ogilby, Proc. Zool. Soc.* 1831, p. 136.

Axis maculatus,* *Jardine, Naturalist's Libr., Mamm.* vol. iii, pp. vi and 167,† pl. xiii, 1835; *Gray, List Mamm. Brit. Mus.* p. 178, 1843, *List Osteol. Brit. Mus.* p. 66, 1847, *Proc. Zool. Soc.* 1850, p. 233, *Cat. Ungulata Brit. Mus.* p. 212, 1852, *Cat. Ruminants Brit. Mus.* p. 80, 1872, *Hand-List Ruminants Brit. Mus.* p. 152, 1873 (maculata); *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 262, 1862; *Jerdon, Mamm. India*, p. 260, 1867; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. i, p. 264, 1874; *Sterndale, Mamm. India*, p. 506, 1884; *Percy, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 264, 1894.

Axis major *and* minor, *Hodgson, Journ. Asiat. Soc. Bengal*, vol. x, p. 941, 1841.

Cervus (Hippelaphus) axis, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 180, 1846.

Hyelaphus maculatus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 259, 1874.

Axis nudipalpebra, *Fitzinger, op. cit.* p. 270, 1874.

Axis (Axis) axis, *Pocock, Proc. Zool. Soc.* 1910, p. 948.

Axis axis, *Wroughton, Journ. Bombay Nat. Hist. Soc.* vol. xxi, p. 1193, 1912; *Cabrera, Cat. Met. Mam. Mus. Madrid*, p. 130, 1912; *Dodsworth, Journ. Bombay Nat. Hist. Soc.* vol. xxii, p. 748, 1914.

* Or *maculata*.

† Misprinted *aculatus* in text.

Chital or Chitra; Spotted Deer.

Typical locality the plains of Peninsular India, to which country and Ceylon the species is restricted.

Size medium, the shoulder-height ranging from about 36 to 38 inches; build light and slender, with the legs long;

Fig. 14.—Skull and Antlers of Chital (*Cervus* [*Axis*] *axis*).

general colour bright rufous fawn, spotted all over the body with white at all seasons; a dark stripe from the nape to the extremity of the tail, bordered along the back by one or two rows of white spots; the spots low down on the flanks sometimes blending into a line; chin, upper portion of throat,

insides of ears, under-parts, inner surfaces of limbs, and under side of the tail white; head uniformly brownish, darker on the face; antlers (fig. 14) supported on short pedicles, long, slender, and moderately rugose; the brow-tine long and making nearly a right angle with the beam; the front, or outer, tine of the terminal fork much longer than the hind, or inner, one, and forming the continuation of the beam, from the inner side of which the hind-tine arises; space enclosed by the two antlers more or less distinctly lyrate; irregular snags near the base of the brow-tine frequently developed; ears moderate; tail long, pointed, and evenly haired throughout; face-glands not excessively large; neck and throat smooth.

A dark phase (*C. nudipalpebra*) is occasionally met with, and shows scarcely any indications of spotting, but it has no claim to rank as a subspecies. The largest individuals occur in northern and central India, where the height of the stags commonly reaches to between 36 and 38 inches; in southern India the height is less, usually varying from 30 to 34 inches, although 36 has been recorded. It was to this small south Indian form that the name of *Axis minor* was applied. Fine antlers measure from 35 to 39 inches along the outer curve, with a basal girth of from $3\frac{1}{8}$ to $4\frac{3}{4}$ inches, and a tip-to-tip interval of from $12\frac{3}{4}$ to $25\frac{1}{4}$ inches.

The following two races are recognised:—

A. Antlers stouter; spots larger; forehead usually with dark chevron and a few white spots ..... *C. a. axis.*

B. Antlers lighter; spots smaller; forehead uniformly brown ..... *C. a. ceylonensis.*

## A.—Cervus axis axis.

Typical locality Peninsular India.

Characters as above.

677, *a*. Skin, female, formerly mounted. India. *No history.*

693, *i*. Head, melanistic, mounted. Ganges Khadir. From an animal formerly in the Tower Menagerie, and presented by H.M. King William IV. to the Zoological Society. Type of *Cervus nudipalpebra*. *Purchased* (*Zoological Society*).

697, *a*, *b*, *e*, *j*, *k*. Five frontlets, with antlers. Probably India. *No history.*

* * * *. Pair of antlers, young. Probably India.
*No history.*

45. 1. 8. 119 (697, *g*). Skull and antlers. Nepal.
*Presented by B. H. Hodgson, Esq.*, 1845.

45. 1. 8. 120–121 (697, *e* and *f*). Two frontlets, with antlers. Nepal. *Same history.*

45. 1. 8. 195. Skull, female. Nepal. *Same history.*

48. 8. 14. 17. Skin, two-year-old buck. Sub-Himalayan Tarai near Mussurie. *Purchased* (*Stevens*), 1848.

50. 1. 11. 20 (697, *i*). Frontlet and antlers. Probably India. *Purchased* (*Argent*), 1850.

51. 2. 17. 4. Skin, young, mounted. Probably from an animal bred in London. *Purchased* (*Zoological Society*), 1851.

51. 11. 10. 7 (697, *q*). Skeleton. Menagerie specimen.
*Same history.*

55. 12. 26. 158. Skull, female. Probably India.
*Transferred from the Zoological Society's Museum*, 1855.

57. 2. 24. 11. Skeleton. Menagerie specimen.
*Purchased* (*Zoological Society*), 1857.

58. 6. 24. 16. Skull and antlers. Sikhim.
*Presented by B. H. Hodgson, Esq.*, 1858.

58. 6. 24. 18. Skin, young. Sikhim. *Same history.*

59. 2. 3. 7. Skin, young, mounted.
*Purchased* (*Zoological Society*), 1859.

59. 9. 6. 104 (697, *t*). Skull, immature. Probably India; Dr. A. Günther's collection. *Purchased*, 1859.

67. 4. 12. 240 (697, *y*). Skull and antlers. Probably India. *Lidth de Jeude Collection, purchased*, 1867.

79. 11. 21. 242. Skin, young. Kumaon; collected by Gen. Sir R. Strachey, K.C.B.
*Transferred from India Museum*, 1879.

79. 11. 21. 488 (697, *u*). Skull, with diseased antlers. Probably India. *Same history.*

89. 11. 20. 7–8 (697, *w*, *x*). Two frontlets, with antlers. Khateote Jungle, Central Provinces.
*Presented by Col. J. Evans*, 1889.

91. 8. 7. 31–32. Two skulls and antlers. Dehra Dun.
*Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 33–36. Four pairs of antlers. Same locality.
*Same history.*

91. 8. 7. 37. Skull and antlers. Bengal Sanderbans.
*Same history.*

91. 8. 7. 38–39. Two skulls, with antlers. Rohilkhand; collected by Ross Scott, Esq. *Same history.*

98. 8. 8. 1. Skin, mounted. India.
*Presented by the Duke of Bedford, K.G.*, 1898.

2. 9. 15. 1. Skin, albino female, mounted. Brinja, Oudh.
*Presented by Mrs. Bellew*, 1902.

3. 1. 10. 1. Skin, female. Near Klandapur, S. Kanara.
*Presented by H. A. Latham, Esq.*, 1903.

12. 10. 31. 11. Skull and antlers (fig. 13). Dehra Dun. Length of one antler $38\frac{1}{4}$, of other $36\frac{3}{4}$ inches.
*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

12. 10. 31. 12. Skull and antlers. Basim district, Berar. Length of antlers $37\frac{1}{2}$ inches, basal girth $4\frac{1}{2}$, tip-to-tip interval $24\frac{3}{8}$ inches. *Same history.*

12. 10. 31. 13. Frontlet and antlers. Bulundshahr, Ganges Khadir, Rohilkhand; collected by Mr. Hume. This specimen stands No. 14 in Ward's 1910 list; length of antlers $19\frac{1}{4}$, girth $3\frac{1}{8}$, tip-to-tip $9\frac{1}{2}$ inches. *Same history.*

## B.—Cervus axis ceylonensis.

Axis maculata ceylonensis, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 269, 1874.*

Cervus (Rusa) axis zeylanicus, *Lydekker, Field*, vol. iv, p. 947, 1905, *Ward's Records of Big Game*, ed. 7, p. 70, 1914.

Typical (and only) locality Ceylon; typified by H. Smith's "Ceylon variety."*

Antlers lighter and more slender than in typical race; ground-colour yellower and purer fawn; spots smaller, and absent on the uniformly brown forehead, which has no dark horseshoe-mark.

5. 5. 18. 1. Head, mounted. Ceylon; collected by Lieut.-Col. F. W. Begbie. Co-type of *C. zeylanicus.*
*Presented by Walter Reynolds, Esq.*, 1905.

5. 5. 19. 1. Body-skin. Ceylon. Co-type of *C. zeylanicus.* *Presented by Lieut.-Col. F. W. Begbie*, 1905.

* Cervus axis ceylonensis, H. Smith, in the present writer's *Deer of All Lands*, p. 179, is a misquotation.

## 2. Subgenus **HYELAPHUS.**

Hyelaphus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 181, 1846; *Gray, Cat. Ungulata Brit. Mus.* p. 215, 1852, *Cat. Ruminants Brit. Mus.* p. 79, 1872.

Closely allied, at least in its typical form, to the preceding subgenus (*Axis*), but the build lower and stouter, the pedicles of the antlers longer, the face-glands shallower, and the walls of the glandular clefts on the fronts of the hind-pasterns clothed with long hairs, which project beyond the margins. Auditory bullæ very large; coat either spotted in summer or uniformly coloured at all seasons, darker, at least typically, on under-parts than on back.

In the long antler-pedicles and large auditory bullæ the group shows near affinity to the rusine *C. kuhli*.

The range extends from India through Burma and Tenasserim to Siam, Annam, and the western Philippines.

The species are distinguishable as follows:—

A. Coat typically spotted in summer; face longer... *C. porcinus.*
B. Coat uniformly coloured at all seasons; face shorter..... *C. calamianensis.*

### II. CERVUS (HYELAPHUS) PORCINUS.

Cervus porcinus, *Zimmermann, Spec. Zool. Geogr.* p. 552, 1777; *F. Cuvier, Hist. Nat. Mamm.* vol. iii, pls. 330–332, 1824; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 197, 1827; *J. B. Fischer, Synop. Mamm.* p. 454, 1829; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 172, 1842; *Garrod, Proc. Zool. Soc.* 1877, p. 17; *Brooke, ibid.* 1878, p. 902; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 290, 1884; *Lydekker, Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 104, 1885, *Horns and Hoofs*, p. 301, 1893, *Deer of All Lands*, p. 175, 1898, *Great and Small Game of India, etc.* p. 217, 1900, *Game Animals of India, etc.* p. 241, 1907; *Flower and Lydekker, Study of Mammals*, p. 320, 1901; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 178, 1891; *Blanford, Fauna Brit. India, Mamm.* p. 549, 1891; *Ward, Records of Big Game*, ed. 2, p. 10, 1896; *Evans, Journ. Bombay Nat. Hist. Soc.* vol. xiv, p. 310, 1902; *Bentham, Asiatic Horns and Antlers Ind. Mus.* p. 82, 1908.

Cervus pumilio, *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 120, 1827; *J. B. Fischer, Synop. Mamm.* p. 621, 1829.

Cervus (Axis) porcinus, *H. Smith, op. cit.* vol. v, p. 312, 1827.

Cervus (Axis) pumilio, *H. Smith, op. cit.* p. 313, 1827.

Axis porcinus, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 169, pl. xiv, 1835; *Jerdon, Mamm. India*, p. 262, 1867; *Sterndale,*

*Mamm. India*, p. 508, 1884; *Perey, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 261, 1894; *Dodsworth, Journ. Bombay Nat. Hist. Soe.* vol. xxii, p. 748, 1914.

Cervus (Hyelaphus) porcinus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 181, 1846; *Ward, Records of Big Game*, ed. 6, p. 70, 1910, ed. 7, p. 72, 1914; *Lydekker, Cat. Hume Bequest Brit. Mus.* p. 38, 1913.

Fig. 15.—Skull and Antlers of Hog-Deer (*Cervus* [*Hyelaphus*] *porcinus*).

Hyelaphus porcinus, *Gray, List Osteol. Brit. Mus.* p. 67, 1847, *Proc. Zool. Soe.* 1850, p. 233, *Cat. Ungulata Brit. Mus.* p. 215, 1852, *Cat. Ruminants Brit. Mus.* p. 72, 1872, *Hand-List Ruminants Brit. Mus.* p. 150, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 262, 1862.

Axis oryzus, *Kelaart, Prodromus Faun. Zeylan.* p. 83, 1852.

Hyelaphus porcinus pumilio, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 258, 1874.

Cervus minor, *Selater, List Anim. Zool. Gardens*, p. 169, 1883; nec Axis minor, *Hodgson*, 1841.

Axis (Hyelaphus) porcinus, *Poeock, Proc. Zool. Soe.* 1910, p. 950.

Para; Hog-Deer.

Typical locality the Indo-Gangetic Plain of India.

Height at shoulder ranging from about 25 to 29 inches; build heavy and low, with the legs short; face comparatively short; hairs on the back not ringed, but with pale tips; general colour in winter rufous or yellowish brown, with a somewhat speckled appearance owing to the pale tips of the hairs, under-parts much darker than back; in summer upper-parts typically paler and more or less spotted in the early part of the season with pale brown or white, the spots sometimes limited to one or two rows on each side of a dark stripe down the middle of the back; young fully spotted for about the first six months; antlers (fig. 15) supported on long pedicles, with the hind, or inner, tine of the terminal fork the shorter, and the brow-tine relatively stout and long, being considerably longer than the head in fully adult individuals; ears rather large, well haired externally, white internally; tail moderately long, well-haired, but not bushy, whitish beneath; face-glands small; metatarsal tuft slightly lighter than rest of the leg. Skull moderately compressed in front of orbits, which are not prominent. Fine antlers measure from 20 to 23¼ inches in length along the outer curve, with a basal girth of from 3 to 4½ inches, and a tip-to-tip interval of from 6⅝ to 22½ inches.

The range extends from India to Siam and Annam, the two races here recognised being distinguished as follows:—

A. Size smaller; coat spotted in summer..... *C. p. porcinus.*
B. Size larger; coat uniformly coloured at all seasons..... *C. p. annamiticus.*

### A.—Cervus porcinus porcinus.

Typical locality the Indo-Gangetic Plain of India.

Size relatively small; coat spotted in summer.

The distributional area includes India, throughout the Indo-Gangetic plain from Sind and the Punjab to Assam, thence through Sylhet and Tenasserim to Burma. Although it has been reported from the highlands of Central India and Bombay, it is doubtful if the species ranges to any extent into Peninsular India, although it may be found some

distance up the larger tributaries of the Ganges. It has been reported from Madras, but apparently from the name hog-deer having been misapplied to the chevrotain and muntjac. In Ceylon it has been introduced into certain districts.

42. 5. 3. 7. Pair of antlers. Probably India.
*Purchased* (*Tucker*), 1842.

45. 1. 8. 124. Frontlet and antlers. Nepal.
*Presented by B. H. Hodgson, Esq.*, 1845.

45. 1. 8. 125. A similar specimen. Same locality.
*Same history.*

45. 1. 8. 194. Skull, female. Same locality.
*Same history.*

* * * *. Two frontlets, with antlers. Probably India.
*No history.*

698, *r*. Pair of antlers. Probably India. *Purchased.*

† † † †. Two pairs of antlers. Probably India.
*No history.*

‡ ‡ ‡ ‡. Skin, formerly mounted. Probably India.
*No history.*

0. 0. 0. 0. Skin. Ceylon. *Purchased* (*Zoological Society*).

47. 5. 17. 21. Skin, formerly mounted. Probably India.
*Purchased* (*Bartlett*), 1847.

52. 2. 28. 6. Skull, with antlers. Probably India.
*Purchased* (*Baker*), 1852.

56. 5. 6. 62. Skull, with antlers. Darjiling, Sikhim; collected by W. Theobald, Esq.
*Presented by Dr. T. Oldham*, 1856.

58. 5. 4. 19. Skull, with antlers. Probably India.
*Transferred from the Zoological Society's Museum*, 1858.

58. 6. 24. 113. Skin, female. Sikhim.
*Presented by B. H. Hodgson, Esq.*, 1858.

58. 12. 16. 2. Skeleton, female. Ceylon.
*Purchased* (*Zoological Society*), 1858.

65. 5. 9. 19. Skin, young, formerly mounted. Locality unknown. *Purchased* (*Zoological Society*), 1865.

67. 5. 20. 7. Skull and antlers. Assam.
*Purchased* (*Cutter*), 1867.

79. 11. 21. 188. Skull and antlers. Burma.
*Transferred from India Museum*, 1879.

91. 8. 7. 40. Frontlet and antlers. Ganges Khadir, near Meerut. *Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 41. Frontlet and antlers. Ganges Khadir, near Bulundshahr, Rohilkhand. *Same history.*

91. 8. 7. 42. Skull and antlers. Garo Hills, Assam; collected by G. P. Sanderson, Esq. *Same history.*

91. 8. 7. 43–44. Two skulls, with antlers. Sub-Himalayan Tarai, near Maradabad; collected by Ross Scott, Esq. *Same history.*

1. 9. 7. 2. Skull and antlers, with the shed antlers of the six preceding years (1894–1899). Panichatta, Bengal. *Presented by E. le F. Davys, Esq.*, 1901.

1. 9. 7. 3. Skull and antlers. Same locality. Length of antlers $21\frac{5}{8}$ inches, basal girth $3\frac{1}{4}$, tip-to-tip interval $6\frac{5}{8}$ inches. This specimen (fig. 15) is third in Ward's 1914 list. *Same history.*

1. 9. 28 1. Skin, mounted. Burma. *Presented by Major G. H. Evans*, 1901.

1. 9. 28. 2. Skull and antlers. Burma. *Same history.*

12. 10. 31. 13. Frontlet and antlers. Ganges Khadir, near Bulundshahr. Length of antlers $19\frac{1}{4}$ inches, basal girth $3\frac{1}{8}$, tip-to-tip interval $9\frac{1}{2}$ inches. *Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

## B.—Cervus porcinus annamiticus.

Hyelaphus annamiticus, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 50, 1888.

Cervus porcinus hecki, *Lydekker, Field*, vol. cxi, p. 583, 1908; *Ward, Records of Big Game*, ed. 6, p. 70, 1910, ed. 7, p. 72, 1914.

Typical locality Annam, but the range also including Siam.

As represented by the Siamese form (typified by a stag living in the Berlin Zoological Gardens about 1899, and figured in Heck's *Lebende Bilder aus dem Reiche der Tiere*, pl. 69, 1899), this race is rather larger than the typical one, from which it also differs by the absence of spots in the summer coat—a feature which may be common to all hog-deer from the countries east of the Bay of Bengal.

61. 4. 12. 19. Pair of antlers. Cambodia; collected by Monsieur Mouhot. *Purchased*, 1861.

## III. CERVUS (HYELAPHUS) CALAMIANENSIS.

Hyelaphus calamianensis, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 49, 1888.

Cervus culionensis, *Elliot*, *Field Mus. Zool. Pub.* vol. i, p. 157, 1897; *Lydekker*, *Deer of All Lands*, p. 173, 1898; *Ward*, *Records of Big Game*, ed. 6, p. 70, 1910.

Cervus (Hyelaphus) calamianensis, *Lydekker*, *Field*, vol. cv, p. 505, 1905.

Cervus calamianensis, *Ward*, *Records of Big Game*, ed. 6, p. 70, 1910.

Rusa culionensis, *Hollister*, *Philippine Journ. Sci.* sect. D, vol. vii, p. 40, 1912.

Rusa calamianensis, *Hollister*, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 339, 1913.

Typical, and only, locality the island of Calamianes, or Culion, on the western side of the Philippine group to the north of Palawan.

As represented by the under-mentioned specimen, this species is clearly a *Hyelaphus* and not a *Rusa;* and as the so-called *C. culionensis* (which is considered by Hollister to be inseparable from the present species) has the large auditory bullæ and long antler-pedicles of *Hyelaphus*, there is good reason for referring it to that subgenus.

As represented by the under-mentioned specimen, this deer is distinguished from the type species by the shorter and more stunted face, shorter and more rounded ears, and the following details in colouring:—the white on the under side of the lower jaw, instead of being restricted to the chin, extends backwards to form a largish patch on the throat; the fore part of this throat-patch being separated from the jaw-patch by a narrow bar of fawn; there is a white moustache-mark, and more white on the insides of their ears and at their roots than in the typical hog-deer; the legs are a darker brown, and the back is bright golden brown, passing into orange on the buttocks.

Elliot described *C. culionensis* as a small deer with the hind-quarters elevated, the head slender, the nose rather long and pointed, the hair somewhat coarse and stiff, especially on the flanks, where it is longest, the ears relatively long, slightly rounded, and thickly haired externally, and the tail rather bushy. As the antlers of the type were in velvet and not fully developed, their characters could not be given.

The general colour is uniform cigar-brown, with a tinge of ochery, but a black stripe of about an inch in width runs from the shoulders to the root of the tail, the latter being brown above and white beneath; the under lip and chin are yellowish white, the chest, shoulders, and much of the underparts purplish brown, with long white hairs intermingled, but the abdomen and inside of the thighs are white, and the legs blackish brown, with a long narrowish white stripe on the front of the hind-pair.

The deer to which the under-mentioned head and skin pertained, while living in the Duke of Bedford's park at Woburn, was regarded as a hog-deer. It resembled the Indian hog-deer in the general character of the antlers (somewhat malformed), in the colour and nature of the coat, in the character of the tail, and in the structure of the skull, more especially in the comparative shallowness of the pits for the face-glands and the shape of the upper end of the nasal bones. In all these respects the specimen differs from the sambar group.

5. 3. 19. 1. Head, mounted, body-skin, and skull, immature. Philippines, probably Calamianes. In the skull the milk-molars are still retained and canines are wanting.

*Presented by the Duke of Bedford, K.G.*, 1905.

### 3. Subgenus **RUSA.**

Rusa, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv. p. 108, 1827; *Gray*, *Cat. Ungulata Brit. Mus.* p. 205, 1852; *Brooke*, *Proc. Zool. Soc.* 1878, p. 900; *Rütimeyer*, *Abk. schweiz. pal. Ges.* vol. viii, p. 45, 1881; *Lydekker*, *Deer of All Lands*, p. 141, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 946.

Hippelaphus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 176, 1846.

Ussa (Oussa), *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 20, 1888.

Sambar, *Heude*, *op. cit.* pp. 20 and 41, 1888.

Large, medium-sized, or small deer, with rounded, normally three-tined antlers, in which the brow-tine forms an acute angle with the beam, and typically no glandular cleft on front of hind-pasterns; coat generally uniformly coloured, shaggy, and forming a mane on neck and throat; ears large; face-glands completely evertile; muffle extending some distance below nostrils; tail relatively long and bushy;

upper molars high-crowned, with small additional column on inner side. Young uniformly coloured or spotted. In old animals the nasals develop a plate at the upper expanded portion which tends to grow over the lachrymal vacuity of the same side; in some of the smaller forms—notably the Philippine—the vacuity is reduced to a mere slit.

The distributional area includes the greater part of the Oriental region, extending northwards into Sze-chuan.

The species here recognised may be distinguished as follows :—

A. Antler-pedicles and auditory bullæ normal.
  *A'*. Coat uniformly coloured.
    *A''*. Antlers rounded and, normally, 3-tined.
      *a*. Size large to small; dorsal hairs not annulated; antlers stout and rugose, with the hind terminal tine, when it and its fellow are unequal, the longer and forming the continuation of the beam; intercornual space **V**- or **U**-shaped ..... *C.* (*R.*) *unicolor.*
      *b*. Size large to medium; dorsal hairs annulated; antlers thinner and less rugose, with the hind terminal tine the longer, and forming the continuation of the beam; intercornual space lyrate ..... *C.* (*R.*) *timoriensis.*
    *B''*. Antlers flattened and many-tined.
      Size medium ..... *C.* (*R.*) *tavistocki.**
  *B'*. Coat spotted.
    Size medium ..... *C.* (*R.*) *alfredi.*
B. Antler-pedicles longer and auditory bullæ larger.
    Size small ..... ..... *C.* (*R.*) *kuhli.*

## IV. CERVUS (RUSA[?]) KUHLI.

Cervus kuhlii,† *Müller and Schlegel, Verh. Nat. Geschied. Nederland. Zool.* p. 223, 1844; *Brooke, Proc. Zool. Soc.* 1878, p. 902; *Ward, Records of Big Game*, ed. 2, p. 11, 1896; *Lydekker, Deer of All Lands*, p. 174, 1898.

Cervus (Hippelaphus) kuhlii, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 179, 1846.

Rusa kuhlii,† *Gray, List Osteol. Brit. Mus.* p. 68, 1847, *Cat. Ruminants Brit. Mus.* p. 79, 1872, *Hand-List Ruminants Brit.*

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* Provisionally ranked as a species.
† Modified by later writers to *kuhli.*

*Mus.* p. 150, 1873; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 355, 1873, vol. lxx, pt. 1, p. 300, 1874; *Garrod, Proc. Zool. Soc.* 1877, p. 17; *Lyon, Proc. U.S. Nat. Mus.* vol. xl, p. 70, 1911.

Cervus (Hyelaphus) kuhli, *Ward, Records of Big Game*, ed. 6, p. 71, 1910, ed. 7, p. 73, 1914.

Typical (and only) locality the Bavian, or Bawean, Islands, between Borneo and Java.

Type in Leyden Museum.

A small deer, differing from all the following species by the longer antler-pedicles and the larger auditory bullæ—characters affiliating it to *Hyelaphus*, with which it apparently agrees in the presence of a glandular cleft in the hind-pasterns.

Height at shoulder about 27 inches; build light and tall; face comparatively short; coat moderately coarse and long, with the hairs on the back ringed; general colour uniform brown, without a dark stripe on the back, and the under-parts rather darker; young uniformly coloured; antlers not much longer than the head, supported on relatively long pedicles; their general form similar to those of the Malay sambar, but thinner and less rugose, with the brow-tine very short; ears small and pointed, thickly haired externally; tail moderately long and bushy; face-glands small; metatarsal glands only slightly lighter than rest of legs; no mane on neck.

* * * *. Skin, mounted, and limb-bones. Bavian Islands. Co-type. *By exchange with the Leyden Museum.*

46. 2. 16. 1. Skin, immature, formerly mounted. Java, probably imported from the Bavian Islands.

*Purchased (Franks, by whom this specimen was obtained from the Leyden Museum)*, 1846.

71. 3. 3. 4. Skin, female. Bavian Islands.

*Purchased (Zoological Society)*, 1871.

## V. CERVUS (RUSA) ALFREDI.

Cervus alfredi, *Sclater, Proc. Zool. Soc.* 1876, p. 381; *Brooke, ibid.* 1877, p. 59, 1878, p. 902; *Garrod, ibid.* 1877, p. 4; *Meyer, ibid.* 1879, p. 666; *Lydekker, Deer of All Lands*, p. 172, 1898.

Axis alfredi, *Gray, Cat. Ruminants Brit. Mus.* p. 80, 1872.

Rusa alfredi, *Garrod*, *Proc. Zool. Soc.* 1877, p. 17; *Hollister*, *Philippine Journ. Sci.* sect. D, vol. vii, p. 40, 1912.

Melanaxis alfredi, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 47, 1888.

Typical, and only, locality Philippines; the type specimen having been received from Manila. The distributional area is stated to include the islands of Cebu, Guimaras, Leyte, Masbate, Negros, Panay, and Samar, on the eastern side of the group.

Size relatively small, the height at the shoulder being about 28 inches; build long and low; face rather long; coat less coarse and shaggy than in any of the following forms; general colour dark blackish brown, frequently with a deep black line along the middle of the back, and marked with a number of whitish spots, forming a regular row on each side of the back, but less regularly distributed elsewhere; under-parts, chin, lower lip, inner surface of buttocks and of upper portion of legs, as well as fronts of thighs, white; young spotted. Antlers supported on short pedicles, apparently of the general type of those of the Malay sambar, but relatively smaller, and with a shorter brow-tine; ears short and rounded, about one-third the length of the head, almost naked behind; face-glands moderately large; no mane on neck; tail rather short and thinly haired, with some white on lower surface; hind-pasterns apparently with a glandular cleft.

76. 2. 30. 1. Skin, mounted, and skeleton (1681, *a*). Philippines. Type. *Purchased* (*Zoological Society*), 1876.

76. 2. 30. 2. Skin, young. Born in London, Zoological Gardens; the offspring of Nos. 76. 2. 30. 1 and 79. 3. 20. 1. *Same history.*

79. 3. 20. 1. Skin, female, mounted. Philippines. *Purchased* (*Zoological Society*), 1879.

## VI. CERVUS (RUSA) TIMORIENSIS.

Cervus timoriensis, *Blainville*, *Journ. Phys.* 1822, p. 267; *F. Cuvier*, *Hist. Nat. Mamm.* vol. iv, pl. 361, 1824; *Brooke*, *Proc. Zool. Soc.* 1878, p. 903.

Cervus peronii, *Cuvier*, *Ossemens Fossiles*, ed. 3, vol. iv, p. 46, 1825; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 114, 1827; *J. B. Fischer*, *Synop. Mamm.* p. 453, 1829.

Cervus (Rusa) peronii, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 311, 1827.

Axis peronii, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 165, pl. xii, 1835.

Cervus russa timoriensis, *Müller and Schlegel, Verh. Nat. Geschied. Nederland. Zool.* pp. 212 and 220, 1844.

Cervus (Hippelaphus) peronii, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 179, 1846.

Rusa peronii, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 165, pl. xii, 1835; *Gray, Knowsley Menagerie*, p. 63, 1850, *Cat. Ungulata Brit. Mus.* p. 211, 1852, *Cat. Ruminants Brit. Mus.* p. 78, 1872, *Hand-List Ruminants Brit. Mus.* p. 150, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 261, 1862; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 355, 1873, vol. lxx, pt. 1, 317, 1874; *Garrod, Proc. Zool. Soc.* 1877, p. 17.

Hippelaphus timoriensis, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. iii, p. 51, 1896.

Cervus hippelaphus timoriensis, *Lydekker, Deer of All Lands*, p. 170, 1898.

Rusa.

Typical locality Timor.

Type in Paris Museum.

In its larger phase, a deer with the general form, coat, and colouring of a sambar, but the ears smaller, the tail thin, the hairs on the back banded with differently-coloured rings, and the sides of the upper lip, chin, under-parts, and inner sides of the thighs and buttocks more or less distinctly whitish; size medium; antlers comparatively slender and only moderately rugose, with the brow-tine of medium or short length, and making a large acute angle with the beam; the hind, or inner tine of the terminal fork much longer than the front, or outer, one, and forming the continuation of the beam, from the front, or front-outer surface of which the front tine arises as an offshoot; the two antlers enclosing a more or less distinctly lyrate space. Young uniformly coloured; hind-pasterns apparently with a glandular cleft.

The three recognised races may be distinguished as follows:—

A. Size smaller.
  *a*. Neck distinctly maned ..... *C. t. timoriensis.*
  *b*. Neck maneless ..... *C. t. moluccensis.*

B. Size larger ..... *C. t. tunjuc.*

## A.—Cervus timoriensis timoriensis.

Cervus hippelaphus timoriensis, *Lydekker*, *Deer of All Lands*, p. 170, 1898; *Trouessart*, *Cat. Mamm.* p. 873, 1899; *Ward*, *Records of Big Game*, ed. 6, p, 67, 1910, ed. 7, p. 67, 1914.

Typical locality Timor; the range also including the islands of Semao and Kambing, which, with Timor, form the continuation of the Sumatra-Java line.

Type in Paris Museum.

A relatively small deer, of the same approximate size as the next race, but distinguished by the thicker hair on the neck, the more distinctly tufted tail, certain differences in coloration, especially on the face and rump, and the wider antlers; forehead grey; face, neck, upper part of flanks, and greater portion of the chest dark blackish brown, the brown of the chest forming a streak between the legs; middle of back almost black; under-parts, inner surfaces of thighs, and a band above the hoofs brownish or ochery yellow, passing into dirty white on the hind portion of the abdomen; lips and inner surfaces of ears white, as are also the inner surfaces of the buttocks; tail-tuft dark blackish brown; in the males a whitish streak runs from above each eye across the cheek to the side of the neck; antler-measurements are not recorded.

67. 1. 30. 2. Skin, female, formerly mounted. Timor. From an animal presented to the Zoological Society by Capt. L. Brayley. *Purchased* (*Zoological Society*), 1867.

## B.—Cervus timoriensis moluccensis.

Cervus moluccensis, *Quoy and Gaimard*, *Voyage Astrolabe*, *Zool.* vol. i, p. 133, pl. xxiv, 1830; *Eydoux and Gervais*, *Mag. Zool.* vol. vi, p. 26, 1836, *Voyage Favorite*, *Mamm.* p. 26, 1839; *Brooke*, *Proc. Zool. Soc.* 1878, p. 904; *Lydekker*, *Horns and Hoofs*, p. 299, 1893; *Ward*, *Records of Big Game*, ed. 2, p. 12, 1896.

Cervus russa moluccensis, *Müller and Schlegel*, *Verh. Nat. Geschied. Nederland. Zool.* pp. 212 and 220, 1844.

Cervus (Hippelaphus) moluccensis, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 179, 1846.

Rusa moluccensis, *Gray*, *Knowsley Menagerie*, p. 62, 1850, *Cat. Ungulata Brit. Mus.* p. 209, 1852, *Cat. Ruminants Brit. Mus.* p. 77, 1872, *Hand-List Ruminants Brit. Mus.* p. 149, 1873,

partim; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 354, 1873, vol. lxx, pt. 1, p. 320, 1874; *Garrod, Proc. Zool. Soc.* 1877, p. 17.

Hippelaphus moluccensis, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. iii, p. 94, 1896.

Cervus hippelaphus moluccensis, *Lydekker, Deer of All Lands*, p. 166, pl. xii, 1898; *Trouessart, Cat. Mamm.* p. 879, 1899; *Ward, Records of Big Game*, ed. 6, p. 67, 1910, ed. 7, p. 67, 1914.

Typical locality the Molucca group (Amboina, Boru, and Batchian); the range also including Celebes.

Stated to differ from the Javan form of the next race by its inferior size, and especially the want of a distinct mane on the neck of the males, and the absence of a distinct terminal tuft to the tail; as a rule, the antlers are relatively small, the build is low and stout, and the head large and thick. In two exceptionally fine pairs of antlers the dimensions are as follows: length along outer curve $36\frac{1}{8}$ and $27\frac{1}{2}$ inches; basal girth $4\frac{5}{8}$ and $4\frac{3}{4}$ inches; tip-to-tip interval $18\frac{1}{2}$ and $14\frac{1}{2}$ inches.

Like the preceding race, the Moluccan rusa may have been introduced into its present habitat by the Malays.

697, *k*. Frontlet and antlers, provisionally referred to this race. Locality unknown. *No history.*

61. 12. 11. 27. Skull (1427, *d*), with antlers, and head-skin (61. 12. 11. 28). Batchian; collected by Dr. A. R. Wallace, C.M. *Purchased*, 1861.

65. 12. 8. 30 (1427, *c*). Skeleton, immature. Probably from the Moluccas. *Purchased (Zoological Society)*, 1861.

67. 4. 12. 243. Skull, with antlers, immature. Probably from the Moluccas.

*Lidth de Jeude Collection, purchased*, 1867.

84. 4. 24. 6. Skull, immature, with antlers. Amboina.

*Presented by Dr. H. O. Forbes*, 1884.

84. 4. 24. 7. Skull, young. Boru. *Same history.*

97. 4. 3. 2. Skin, mounted. Moluccas.

*Presented by the Duke of Bedford, K.G.*, 1897.

## C.—Cervus timoriensis tunjuc.

Cervus hippelaphus, *F. Cuvier, Hist. Nat. Mamm.* vol. i, pl. 108, 1819; *Cuvier, Ossemens Fossiles*, ed. 2, vol. iv, p. 40, pl. v, figs. 31–34, 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 105, 1827; *J. B. Fischer, Synop. Mamm.* p. 451, 1829; *Pucheran,*

*Arch. Mus. Paris*, vol. vi, p. 402, 1852; *Brooke, Proc. Zool. Soc.* 1878, p. 905; *Forbes, Naturalist's Wanderings in E. Archipelago*, p. 31, 1885; *Wallace, Malay Archipelago*, ed. 3, p. 300, 1890; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 179, 1891; *Lydekker, Horns and Hoofs*, p. 297, 1893, *Deer of All Lands*, p. 162, 1898; *Bentham, Asiat. Horns and Antlers Ind. Mus.* p. 78, 1908; *nec* Cervus elaphus hippelaphus, *Kerr*, 1792.

Cervus (Rusa) hippelaphus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 309, 1827.

Cervus tunjuc, *Vigors and Horsfield in Lady Raffles's Memoir of Sir Stamford Raffles*, p. 645, 1830; *Blyth, Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 151, 1863.

Rusa hippelaphus, *Gray, List Mamm. Brit. Mus.* p. 179, 1843, *Proc. Zool. Soc.* 1850, p. 231, *Cat. Ungulata Brit. Mus.* p. 209, 1852, *Cat. Ruminants Brit. Mus.* p. 77, 1872, *Hand-List Ruminants Brit. Mus.* p. 148, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 261, 1862, partim; *Garrod, Proc. Zool. Soc.* 1877, p. 17.

Cervus russa, *Müller and Schlegel, Verh. Nat. Geschied. Nederland. Zool.* p. 217, pl. xliv, 1844.

Cervus (Hippelaphus) hippelaphus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 178, 1846.

Rusa paradoxa, *Brehm, Zool. Garten*, 1864, p. 11.

Cervus rufus, *Blyth*, quoted by *Gray, Cat. Ruminants Brit. Mus.* p. 77, 1872.

Cervus hippelaphus typicus, *Lydekker, Deer of All Lands*, p. 164, 1898; *Ward, Records of Big Game*, ed. 6, p. 67, 1910, ed. 7, p. 67, 1914.

Cervus (Rusa) hippelaphus, *Ward, Records of Big Game*, ed. 6, p. 66, 1910, ed. 7, p. 66, 1914.

SUMATRAN and JAVAN RUSA.

Typical locality Sumatra.

Smaller than the Indian sambar, and of the approximate size of a red deer; head of moderate length, with the facial profile nearly straight; throat and neck of males with a well-developed mane; ears broad, and less than half the length of the head; tail only slightly longer than ears, thinner than in the Malay sambar, and ending in a tuft of thick coarse hairs; general colour in summer dark grizzled, ochery brown with a tinge of red, darker on the hind-quarters and thighs than elsewhere; front of neck, chest, and under-parts varying from dirty white to brownish grey, and a dark reddish brown longitudinal streak on front of chest; flanks shot with rusty brown, and frequently with a patch of that colour; inner sides of legs, shanks, and inner sides of buttocks dirty whitish; chin, lips, and under surface

of lower jaw whitish, with a brownish spot on the lower lip at angle of mouth; inner surfaces of ears whitish; tail yellowish brown above and dirty white beneath, at or near the tip uniformly blackish brown. In winter general colour

Fig. 16.—Frontlet and Antlers of Javan Rusa (*Cervus* [*Rusa*] *timoriensis tunjuc*).

From a specimen in the collection of Sir E. G. Loder, Bart.

more greyish brown; under-parts and inner surfaces of the upper portion of fore-legs, thighs, and buttocks dirty yellowish white; tip of lower jaw, border of upper lip, and neighbourhood of nose white; a blackish spot beneath the angle of the mouth, and often a brownish band round the

muzzle. In females the streaks on the chest and the tail are somewhat lighter-coloured.

Fine antlers measure from 33 to 37½ inches along the front curve, with a basal curve of from 4½ to 5⅜, and a tip-to-tip interval of from 11½ to 25½ inches.

*Cervus hippelaphus*, of Cuvier, although generally stated to be a Javan form, is typified by antlers brought from Sumatra by Diard, and the types of *C. tunjuc* are also Sumatran; but *C. russa* is typically Javan, while *Rusa paradoxa* and *C. rufus* are based on representatives of this deer introduced, respectively, into Mauritius and Rodriguez. Deer of this type also occur in Borneo, where, however, according to Brooke, they have been introduced by the Malays.

If the Javan form be racially distinct from the Sumatran it should be known as *C. timoriensis rusa*.*

51. 9. 8. 10–11. Two skins, immature, formerly mounted. Sumatra. Co-types. *Presented by Sir T. Stamford Raffles, some time previous to* 1830.

* * * *. Skin, female, formerly mounted. Java. *No history.*

697, *o*. Frontlet and antlers, provisionally referred to this race. Locality unknown. *No history.*

76. 11. 17. 1. Single antler. Mauritius; introduced; collected by Mr. Le Soeuf.

*Presented by Dr. P. L. Sclater*, 1876.

5. 3. 26. 1. Frontlet and antlers. Rodriguez Island, Mascarene group; introduced.

*Presented by Col. H. W. L. Hime*, 1905.

10. 4. 5. 158–159. Two frontlets, with antlers. Bröntok, south central Borneo; collected by G. C. Shortridge, Esq.

*Presented by O. Thomas, Esq.*, 1910.

10. 4. 6. 74–75. Two upper halves of skulls, with antlers. Sapandjang Is., near Kangean Is., Java Sea; same collector. *Same history.*

* *Russa* is an incorrect rendering of the Malay name.

## VII. CERVUS (RUSA) TAVISTOCKI.

Cervus (Rusa) tavistocki, *Lydekker*, *Ann. Mag. Nat. Hist.* ser. 7, vol. vi, p. 205, 1900.

Rusa tavistocki, *Hollister*, *Philippine Journ. Sci.*, sect. D, vol. vii, p. 40, 1912.

Typical locality not definitely known, but probably one of the islands of the Philippine group.

If this deer be a valid species, or race, and not a "sport" or hybrid, it may be the same as one of those named by Heude in the list on page 89.

Apparently related to *C.* (*R.*) *timorensis*, but with flattened and somewhat palmated antlers, which, when fully developed, show at least six points on each side; shoulder-height about 30 inches.

As regards their special characters, the antlers are more or less flattened throughout and display a marked tendency to palmation. The brow-tine is much flattened, with a sharp posterior edge, and on the right side is distinctly bifurcate, although only imperfectly so on the left; the outer tine of the terminal fork is likewise much flattened, sharp-edged behind, and trifurcate, but the inner tine on the right side is conical and simple, although showing a tendency to branch on the left side; the number of points on each antler is thus six.

0. 6. 8. 2. Skin, mounted. Type. The stag to which this skin belonged was living, together with two or three other similar deer, in the park at Woburn Abbey for about two years. *Presented by the Duke of Bedford, K.G.*, 1900.

## VIII. CERVUS (RUSA) UNICOLOR.

Cervus axis unicolor, *Kerr*, *Linn.'s Anim. Kingdom*, p. 306, 1792.

Cervus axis major, *Kerr*, *Linn.'s Anim. Kingdom*, p. 306, 1792; based on Pennant's "Greater Axis."

Cervus unicolor, *Bechstein*, *Allgemein. Uebersicht vierfüss. Thiere*, vol. i, p. 112, 1799; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 108, 1827; *Lesson*, *Nouv. Tabl. Règne Anim.*, *Mamm.* p. 171, 1842; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 543, 1891; *Lydekker*, *Horns and Hoofs*, p. 293, 1893, *Deer of All Lands*, p. 144, pls. x and xi, 1898, *Great and Small Game of India, etc.* p. 206, 1900, *Game Animals of India, etc.* p. 223, 1907; *Ward*, *Records of Big Game*, ed. 2, p. 3, 1896; *Aoki*, *Annot. Zool. Japon.* vol. viii, p. 341, 1913.

Cervus albicornis, *Beehstein*, *Allgemein. Uebersicht vierfüss. Thiere*, vol. i, p. 112, 1799.

Cervus niger, *Blainville*, *Bull. Soc. Philom.* 1816, p. 76, *vide Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xi, p. 449, 1842; *J. B. Fischer*, *Synop. Mamm.* p. 453, 1829.

Cervus aristotelis, *Cuvier*, *Ossemens Fossiles*, ed. 3, vol. iv, p. 503, 1825; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 110, 1827; *J. B. Fischer*, *Synop. Mamm.* p. 452, 1829; *Lesson*, *Nouv. Tabl. Règne Anim., Mamm.* p. 171, 1842; *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xi, p. 449, 1842; *Sclater*, *Trans. Zool. Soc.* vol. vii, p. 350, 1871; *Brooke*, *Proc. Zool. Soc.* 1878, p. 901; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 289, 1884; *Lydekker*, *Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 103, 1885; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 176, 1891; *Flower and Lydekker*, *Study of Mammals*, p. 320, 1891; *Bentham*, *Asiat. Horns and Antlers Ind. Mus.* p. 72, 1908.

Cervus leschenaultii, *Cuvier*, *Ossemens Fossiles*, ed. 3, p. 506, 1825.

Cervus hippelaphus, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 105, 1827; *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 169, pl. xi, 1835; *Elliot*, *Madras Journ.* vol. x, p. 220, 1839; *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xi, p. 449, 1842, vol. xx, p. 174, 1852, partim; *nec* C. elaphus hippelaphus, *Kerr*, *nec* C. hippelaphus, *Cuvier*.

Cervus (Rusa) hippelaphus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 309, 1827, partim; *Nitsche*, *Studien über Hirsche*, p. 32, 1898.

Cervus (Rusa) unicolor, *H. Smith*, op. cit. p. 310, 1827; *Ward*, *Records of Big Game*, ed. 6, p. 59, 1910, ed. 7, p. 61, 1914; *Lydekker*, *Cat. Hume Bequest Brit. Mus.* p. 36, 1913.

Cervus (Rusa) aristotelis, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 310, 1827.

Cervus jarai, *Hodgson*, *Gleanings in Science*, vol. iii, p. 321, 1831.

Cervus heterocerus, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. x, p. 721, 1841, nomen nudum.

Cervus jarya, nepalensis, *and* heterocerus, *Hodgson*, *op. cit.* p. 914, 1841, nomina nuda.

Rusa aristotelis, *Gray*, *List Mamm. Brit. Mus.* p. 179, 1843, *Proc. Zool. Soc.* 1850, p. 230, *Cat. Ungulata Brit. Mus.* p. 205, 1852, *Cat. Ruminants Brit. Mus.* p. 76, 1872, *Hand-List Ruminants Brit. Mus.* p. 145, 1873; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 260, 1862; *Jerdon*, *Mamm. India*, p. 256, 1867; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1. p. 279, 1874; *Garrod*, *Proc. Zool. Soc.* 1877, p. 17; *Sterndale*, *Mamm. India*, p. 504, 1884; *Percy*, *Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 257, 1894.

Axis pennantii, *Gray*, *List Mamm. Brit. Mus.* p. 180, 1843.

Rusa hippelaphus, *Gray*, *Hand-List Ruminants Brit. Mus.* p. 148, 1873, partim.

Cervus (Hippelaphus) aristotelis, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 178, 1846.

Cervus (Hippelaphus) niger, *Sundevall*, *op. cit.* p. 183, 1846.

Cervus (Hippelaphus) leschenaulti, *Sundevall*, *loc. cit.* 1846.

Cervus (Hippelaphus) unicolor, *Sundevall*, *loc. cit.* 1846.

Rusa aristotelis nigra, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxx. pt. 1, p. 284, 1874.
Rusa aristotelis leschenaulti, *Fitzinger*, *op. cit.* p. 286, 1874.
Rusa aristotelis unicolor, *Fitzinger*, *op. cit.* p. 287, 1874.

Fig. 17.—Skull and Antlers of Sambar (*Cervus* [*Rusa*] *unicolor*).

Rusa aristotelis heteroceros, *Fitzinger*, *op. cit.* p. 289, 1874.
Rusa equina pennantii, *Fitzinger*, *op. cit.* p. 226, 1874.
Rusa unicolor, *Pocock*, *Proc. Zool. Soc.* 1910, p. 946; *Wroughton*, *Journ. Bombay Nat. Hist. Soc.* vol. xxi, p. 1193, 1912; *Dodsworth*, *ibid.* vol. xxii, p. 748, 1914.

Sambar (Marathi and Dekhani); Jarao (Nepali); Rusa (Malay).

Typical locality Ceylon.

Size typically large; hair coarse and shaggy, the hairs on the back not distinctly banded with differently coloured rings; general colour some shade of dark umber-brown, with chestnut or whitish on the inner side of the buttocks, and often on the under-parts; chin generally white; young either more or less uniformly coloured, or faintly spotted on the hind-quarters; antlers (fig. 17) large, stout, and rugose, with the brow-tine generally long and making an acute angle with the beam, and the front, or outer tine of the terminal fork forming the continuation of the line of the beam when there is any inequality in the length of the two tines; the space enclosed by the antlers of opposite sides more or less V- or U-shaped, but the tips of the antlers frequently inclined inwards; pedicles of antlers short.

Different views are entertained as to whether the various modifications of the sambar type indicate distinct species, or races of one variable species. All the forms in which the front, or outer, tine of the terminal fork of the antlers forms the continuation of the line of the beam, where there is any inequality in the length of the two, are here regarded as races of a single species; but those in which the back, or inner, tine is situated in the direct line of the beam are considered to represent a second species. Whether all the local modifications of the first type are truly indigenous, and therefore entitled to rank as subspecies, is doubtful.

The distributional area includes the undulating, or hilly wooded districts of a large portion of the Oriental region, namely India, Ceylon, Assam, Burma, the Malay Peninsula, Borneo, Siam, Hainan, Formosa, and the Philippines, and extends northwards to Sze-chuan.

The following is a provisional "key" to the better known local races of this variable species:—

A. Face longer; shanks dark.

*a*. Size very large, shoulder-height-reaching 54 inches; terminal tines of antlers subequal, or front one the shorter ..... *C. u. unicolor.*

*b*. Size nearly equal to that of preceding; hind terminal tine the shorter.. ..... *C. u. equinus.*

B. Face shorter; shanks light.
  *a*. Size nearly as large as in typical race ..... *C. u. dejeani*.
  *b*. Size smaller..... *C. u. swinhoei*.
  *c*. Size still smaller; shoulder-height not exceeding about 28 inches.
    *a'*. Size larger (28 inches); conspicuous moustache-markings; chin white..... *C. u. philippinus* (and *mariannus*).
    *b'*. Size smaller, not exceeding 26 inches.
      *a''*. Limbs and under-parts darker.
        *a*³. Shoulder-height 24 to 26 inches; no moustache-markings; skull and teeth larger..... *C. u. nigricans*.
        *b*³. Shoulder-height about 25 inches; conspicuous moustache-markings; skull and teeth smaller..... *C. u. nigellus*.
      *b''*. Limbs and under-parts lighter..... *C. u. boninensis*.

## A.—Cervus unicolor unicolor.

Cervus unicolor typicus, *Lydekker*, *Deer of All Lands*, p. 146, pl. x, 1898, *Game Animals of India, etc.* p. 224, 1907; *Ward*, *Records of Big Game*, ed. 6, p. 60, 1910, ed. 7, p. 62, 1914.

Cervus unicolor unicolor, *Lydekker*, *Cat. Hume Bequest Brit. Mus.* p. 37, 1913.

Typical locality Ceylon; the range including India, and probably extending eastwards as far as the Assam valley, where this race may be separated by the Bramaputra from the next, with which, however, it may locally intergrade. Ceylon sambar are smaller than the mainland form.

Size very large, the height at the shoulder reaching at least 5 feet 4 inches; antlers (fig. 17) long, with the two tines of the terminal fork generally of approximately equal length, but if unequal, the front one usually the shorter, and the hind one rising from the posterior surface of the beam and not forming the continuation of the axis of the latter; general colour almost uniformly dark umber-brown, tending to grey or yellowish in some individuals; under-parts little paler than the back, but chin, inner portion of buttocks, lower surface of tail, and inner sides of upper part of limbs more or less distinctly chestnut; females paler; young reddish, apparently with a black tail and dorsal band, but spots wanting; ears very broad, equal to about half the length of the head; the latter relatively long, with a nearly straight profile; tail moderately bushy, and longer than ear. Fine

antlers measure from 43 to 50 inches along the outer curve, with a basal girth of from $5\frac{1}{4}$ to $9\frac{3}{8}$, and a tip-to-tip interval of from 8 to 49 inches. The presence of an additional (fourth) tine is very rare.

699, *a*. Single antler. From a stag in the menagerie at Exeter Change. *No history.*

699*. Two single antlers. *No history.*

697, *g*. Skull and antlers. Locality unknown. *No history.*

697, *h*. Frontlet and antlers. Locality unknown. *No history.*

697, *m*. Frontlet and antlers. Locality unknown. *No history.*

697, *n*. Frontlet and antlers. Type of Pennant's "Greater Axis," *C. axis major*, and *C. albicornis*. Ceylon (?). *No history.*

697, *r*. Frontlet and antlers. Locality unknown. *No history.*

699, *a*. Skin, formerly mounted. Nepal. *Presented by B. H. Hodgson, Esq.*

699, *v*. Frontlet and antlers. Outer Himalaya; collected by the Rev. R. Everest (after whom Mount Everest is named). *Purchased.*

43. 1. 26. 16. Skull and antlers. Nepal. *Presented by B. H. Hodgson, Esq.*, 1843.

43. 1. 12. 107. Immature skull, female. Nepal. *Same history.*

45. 1. 8. 106 (699, $k^2$). Skull and antlers. Nepal. Type of *C. heterocerus;* figured by Hodgson, *Journ. Asiat. Soc. Bengal*, vol. x. *Same donor*, 1845.

45. 1. 8. 107 (699, *x*). Frontlet and antlers. Nepal. *Same history.*

45. 1. 8. 109. Frontlet and antlers. Nepal. *Same history.*

45. 1. 8. 110. Frontlet and antlers. Nepal. *Same history.*

45. 1. 8. 111. Frontlet and antlers. Nepal. *Same history.*

45. 1. 8. 114. Frontlet and antlers. Nepal. *Same history.*

45. 1. 8. 115 (699, $i^2$). Skull and antlers. Nepal.
*Same history.*

45. 1. 8. 116. Frontlet and antlers. Nepal.
*Same history.*

45. 1. 8 117. Frontlet and antlers. Nepal.
*Same history.*

45. 1. 8. 118. Frontlet and antlers. Nepal.
*Same history.*

45. 1. 8. 198 (699, *l*). Skull and antlers. Nepal.
*Same history.*

45. 1. 8. 199 (699, *m*). Skull, female. *Same history.*

45. 1. 8. 201. Frontlet and antlers, young. Nepal.
*Same history.*

699, *y*. Frontlet and antlers. Nepal. *Same donor.*

699, $l^2$. Skeleton. Nepal. *Same donor.*

* *. Single antler. Nepal. *Same donor.*

699, $a^2$. Single antler. Himalaya. *Same history.*

45. 12. 27. 3. Frontlet and antlers. Locality unknown.
*Purchased* (*Argent*), 1845.

47. 7. 23. 30 (699, $m^2$). Skeleton and antlers. India; collected by Mr. Bartlett. *Purchased*, 1847.

699, $z^2$. Skeleton and antlers. India.
*Purchased* (*Zoological Society*).

52. 10. 5. 5. Skull and antlers. Locality unknown.
*Purchased* (*Argent*), 1852.

53. 8. 22. 1. Skin, mounted, and skull (53. 8. 22. 2 = 699, $q^2$). Ceylon. Topo-type.
*Purchased* (*Zoological Society*), 1853.

58. 6. 24. 19. Skin, immature. Sikhim.
*Presented by B. H. Hodgson, Esq.*, 1858.

58. 6. 24. 20. Skull, with antlers, and skin, immature. Sikhim. *Same history.*

58. 6. 24. 21. Skull, immature female. Sikhim.
*Same history.*

58. 6. 24. 174. Frontlet and antlers. Sikhim.
*Same history.*

58. 6. 24. 175. Frontlet and single antler. Sikhim.
*Same history.*

699, *f*. Frontlet and antlers. India (?).
*Presented by Mrs. Wright.*

699, *j*². Frontlet and antlers. India (?). *No history.*

699, *b*. Antlers. India (?). *No history.*

* * * *. Skull and antlers. India (?). *No history.*

* * * *. Six frontlets, with antlers. India (?). *No history.*

* * * *. Four shed antlers. India (?). *No history.*

63. 5. 13. 6–7. Two pairs of shed antlers. India (?). *Purchased (Zoological Society)*, 1863.

68. 12. 29. 8 (699, *y*²). Skeleton and antlers. India (?). *Same history*, 1868.

79. 11. 21. 184. Skull and antlers. Nepal; collected by B. H. Hodgson, Esq. *Transferred from India Museum*, 1879.

79. 11. 21. 443. Frontlet and antlers. India, probably the Saharunpur district; collected by Dr. Hugh Falconer, sometime Superintendent of the Saharunpur Botanical Gardens. Length of antlers 45⅛ inches. *Same history.*

79. 11. 21. 444. Frontlet and antlers. Same locality and collector. *Same history.*

79. 11. 21. 446. Skull and antlers. Nepal; collected by B. H. Hodgson, Esq. *Same history.*

79. 11. 21. 448. Skull and antlers. India (?). *Same history.*

79. 11. 21. 449. Frontlet and antlers. Dekhan; collected by Col. W. H. Sykes, about 1840. *Same history.*

79. 11. 21. 451. Pair of antlers. Godaveri Valley. *Same history.*

79. 11. 21. 452. Antlers. India (?). *Same history.*

79. 11. 21. 452*. Antlers. India (?). *Same history.*

88. 3. 20. 26. Skull and antlers. India. *Presented by R. Lydekker, Esq.*, 1888.

89. 11. 20. 3. Frontlet and antlers. Khateote Jungle, near Mhow. *Presented by Col. J. Evans*, 1889.

89. 11. 20. 4–5. Two frontlets, with antlers. Ghats, west of Simrol. *Same history.*

89. 11. 20. 6. Frontlet and antlers. Dehra Dun. *Same history.*

91. 8. 7. 16. Frontlet and antlers. Dehra Dun. *Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 17–18. Two frontlets, with antlers. Oudh Tarai. *Same history.*

71. 8. 7. 19–24. Six shed antlers. Chanda, Central Provinces, India. *Same history.*

2. 10. 2. 1. Skin, mounted. India.

*Presented by the Duke of Bedford, K.G.*, 1902.

7. 10. 27. 2. Skull and antlers. Central India. Length of antlers 44½ inches.

*Presented by Mrs. J. G. Anderson*, 1907.

7. 10. 27. 3. Skull and antlers. Same locality. Length of antlers 42½ inches. *Same history.*

12. 10. 31. 9. Skull and antlers (fig. 17). Chanda, Central Provinces. Length of antlers on outer curve 46½, girth 6⅜, tip-to-tip interval 24⅛, widest inside span 30⅞ inches. *Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

## B.—Cervus unicolor equinus.

Cervus equinus, *Cuvier*, *Ossemens Fossiles*, ed. 2, vol. iv, p. 45, pl. v, figs. 37 and 38, 1823; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 112, 1827; *S. Müller*, *Verh. Nat. Geschied. Nederland.* pls. xlii and xlv, 1840–44; *Brooke*, *Proc. Zool. Soc.* 1878, p. 901; *Günther*, *ibid.* 1880, p. 452; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* p. ii, p. 290, 1884; *Flower and Lydekker*, *Study of Mammals*, p. 320, 1891; *Lydekker*, *Horns and Hoofs*, p. 297, 1893; *Ward*, *Records of Big Game*, ed. 2, p. 7, 1896.

Cervus malaccensis, *F. Cuvier*, *Hist. Nat. Mamm.* vol. i, pl. x, 1824; *J. B. Fischer*, *Synop. Mamm.* p. 451, 1829.

Cervus (Rusa) equinus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 311, 1827.

Rusa equina, *Gray*, *List Mamm. Brit. Mus.* p. 179, 1843, *Proc. Zool. Soc.* 1850, p. 231, *Cat. Ungulata Brit. Mus.* p. 210, 1852 (equinus), *Cat. Ruminants Brit. Mus.* p. 77, 1872, *Hand-List Ruminants Brit. Mus.* p. 149, 1873; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 261, 1862; *Jerdon*, *Mamm. India*, p. 260, 1867; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 290, 1874; *Garrod*, *Proc. Zool. Soc.* 1877, p. 17.

Cervus (Hippelaphus) equinus, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 178, 1846.

Cervulus cambojensis, *Gray*, *Proc. Zool. Soc.* 1861, p. 138.

Rucervus cambojensis, *Gray*, *Cat. Ruminants Brit. Mus.* p. 76, 1872, *Hand-List Ruminants Brit. Mus.* p. 145, 1873, partim.

Rusa equina malaccensis, *Fitzinger*, *Sitzber. k. Ak. Wiss Wien*, vol. lxx, pt. i, p. 294, 1874.

Russa equina, *Jentink and Büttikofer*, *Notes Leyden Mus.* vol. xix, p. 63, 1897.

Cervus unicolor equinus, *Lydekker*, *Deer of All Lands*, p. 150, pl. xi, 1898, *Great and Small Game of India, etc.* p. 215, 1900, *Game*

*Animals of India, etc.* p. 232, 1907, *Cat. Hume Bequest Brit. Mus.* p. 38, 1913; *Ward, Records of Big Game*, ed. 6, p. 63, 1910, ed. 7, p. 65, 1914; *Gairdner, J. Siam. Nat. Hist. Soc.* vol. i, p. 117, 1914.

Rusa unicolor equinus, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xxii, p. 467, 1906.

Typical locality Sumatra.

Co-types (figured by Cuvier, *op. cit*) apparently not in Paris Museum.

Nearly as large as Indian representatives of the typical race, but the antlers generally shorter and thicker, with the hind, or inner, tine of the terminal fork much shorter than the front or outer one, and rising as a spur from the inner hind margin of the beam, of which the hind tine forms the direct continuation, and the brow-tine in most cases relatively longer; general colour darker, approaching black or slaty grey in old stags; usually a light ring round the eye; ears rather smaller, with distinct white margins; legs frequently light-coloured; tail more bushy; face comparatively long and straight; new-born young, at least frequently, faintly spotted on hind-quarters, with the general colour foxy red, and the tail and a line down the back blackish or black. Good antlers measure from about 16 to 30 inches along the outer curve, with a basal girth of from $4\frac{1}{4}$ to 7 inches, and a tip-to-tip interval of from $5\frac{1}{2}$ to $24\frac{1}{2}$ inches.

The range is provisionally taken to include most of the large sambar of all the Malay countries, with the exception of Java, and also to comprise those of Assam and Kachar, where these deer are known to produce spotted young, and also of Hainan. It is, however, quite probable that there may be a number of local races. If this prove to be the case, the name *malaccensis* is available for the Malay, and *cambojensis* for the Cambodian form.

61. 4. 12. 18 (1463, *g*). Frontlet and antlers, immature. Cambodia; collected by Monsieur Mouhot. Type of *Cervulus cambojensis*. *Purchased*, 1861.

62. 8. 18. 22. Pair of antlers. Laos Mountains, Cambodia; same collector. *Purchased*, 1862.

67. 5. 20. 3–4 (1781, *g-r*). Two frontlets, with antlers. Assam. *Purchased (Cutter)*, 1867.

67. 5. 20. 6. Skull and antlers. Assam. *Same history.*

67. 7. 8. 24 (1781, *l*). Skull, with antlers, and skin. Locality unknown. *Purchased* (*Zoological Society*), 1867.

68. 3. 21. 5. Skin. Locality unknown.
*Same history*, 1868.

70. 2. 10. 30. Skin, imperfect. Hainan; collected by R. Swinhoe, Esq. *Purchased*, 1870.

70. 2. 10. 31. Skin, female, imperfect. Same locality and collector. *Same history.*

81. 6. 30. 6. Pair of shed antlers. Cochin China; collected by Monsieur Boucard. *Purchased*, 1881.

81. 6. 30. 7–8. Two frontlets, with antlers. Same locality and collector. *Same history.*

84. 4. 14. 3. Skeleton, female. Garo Hills, Assam; collected by G. P. Sanderson, Esq. *Purchased*, 1884.

91. 8. 7. 25–30. Six frontlets, with antlers. Same locality and collector. *Purchased*, 1891.

94. 9. 20. 1. Frontlet and antlers. Locality unknown.
*Presented by Capt. Stewart*, 1894.

12. 10. 31. 10. Skull and antlers. Garo Hills; collected by G. P. Sanderson, Esq.
*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

## C.—Cervus unicolor brookei.

Cervus brookei, *Hose*, *Ann. Mag. Nat. Hist.* ser. 6, vol. xii, p. 206, 1893.

Rusa brookei, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 584, 1906, vol. xxxiii, p. 550, 1907, vol. xl, p. 67, 1901.

Typical locality Mount Dulit, Sarawak.

According to Lyon, smaller than Malay Sambar (apparently regarded as typical *C. equinus*).

The range is taken to include Billiton, Pagi, and Nias Islands.

79. 1. 27. 2. Skull, female. Sarawak, North Borneo; collected by A. H. Everett, Esq. *Purchased*, 1879.

79. 5. 3. 18–19. Two skulls, with antlers. Same locality and collector. *Same history.*

79. 5. 3. 20. Frontlet and antlers. Same locality and collector. *Same history.*

80. 6. 16. 1–3. Three frontlets, with antlers. Rejang Valley, North Borneo; collected by H. B. Low, Esq.
*Purchased*, 1880.

80. 6. 16. 4–6. Three similar specimens. Same locality and collector. *Same history.*

80. 6. 16. 7–8. Two similar specimens. Same locality and collector. *Same history.*

86. 12. 20. 9. Skull, with antlers. Sandakan, British North Borneo; collected by W. B. Pryer, Esq.
*Purchased*, 1886.

87. 2. 10. 9–11. Three frontlets, with antlers. Rajang Valley, North Borneo; collected by H. B. Low, Esq.
*Purchased*, 1887.

92. 9. 4. 3. Skin, young in spotted coat. Mount Dulit, eastern Sarawak. Type. *Presented by Dr. C. Hose*, 1892.

95. 5. 7. 4. Skin, young in spotted coat. Miri Valley, Baram, northern Borneo. Noticed in *Deer of all Lands*, loc. cit. *Same donor*, 1895.

1. 7. 29. 1. Abnormal antlers. Sarawak. There are many more tines than usual, most of which are much palmated. *Same donor*, 1901.

## D.—Cervus unicolor swinhoei.

Rusa swinhoii, *Sclater*, *Proc. Zool. Soc.* 1862, p. 152, *Trans. Zool. Soc.* vol. viii, p. 331, 1871; *Swinhoe*, *Proc. Zool. Soc.* 1870, p. 644; *Gray*, *Cat. Ruminants Brit. Mus.* p. 77, 1872, *Hand-List Ruminants Brit. Mus.* p. 149, 1873; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 2, p. 298, 1874 (swinhoei); *Garrod*, *Proc. Zool. Soc.* 1877, p. 17.

Cervus swinhoii, *Brooke*, *Proc. Zool. Soc.* 1878, p. 901; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 178, 1891; *Flower and Lydekker*, *Study of Mammals*, p. 320, 1891; *Ward*, *Records of Big Game*, ed. 2, p. 8, 1896; *Aoki*, *Annot. Zool. Japon.* vol. viii, p. 341, 1913.

Cervus unicolor swinhoei, *Lydekker*, *Deer of All Lands*, p. 154, 1898, *Ann. Mag. Nat. Hist.* ser. 7, vol. xv, p. 391, 1905; *Ward*, *Records of Big Game*, ed. 5, p. 77, 1907, ed. 6, p. 64, 1910, ed. 7, p. 66, 1914; *Bentham*, *Asiat. Horns and Antlers Ind. Mus.* p. 77, 1908.

Cervus (Rusa) swinhoei, *Nitsche*, *Studien über Hirsche*, p. 32, 1898.

Typical locality Formosa, to which island this race is restricted.

Closely allied to the preceding race, from which it appears to be distinguished by its shorter head and concave profile, relatively longer legs, and the under-mentioned

differences in colour, and the somewhat smaller size. In winter general colour uniform reddish black-brown, with the head and ears reddish yellow-brown, and the upper surface of the nose having a V-shaped blackish brown mark reaching to the eyes; under surface nearly as dark as back, but inner sides of thighs and the entire shanks brownish or whitish yellow, and the bushy tail black all round. In summer the general colour light yellowish red-brown, darker in front than behind, and lightest on under surface. The antlers are of the type of those of the Malay race, but smaller; the skull is very similar to that of the Luzon race. Good antlers measure from 16 to 19¾ inches in length, with a girth of from 3½ to 4½ inches.

* * * *. Skin, immature, mounted. Formosa; collected by R. Swinhoe, Esq., about 1860. Type.
*Purchased (Zoological Society).*

63. 5. 13. 8. Shed antlers, first year. From an animal born in London. *Same history*, 1863.

68. 3. 21. 24. Skull, with antlers (1414, *r*), and skin. Formosa; collected by R. Swinhoe, Esq. *Same history*, 1868.

70. 2. 10. 69 (1414, *b*). Skull. Same locality and collector. *Purchased*, 1870.

1414, *c*. Skull, young female. Same locality and collector. *Same history.*

70. 2. 10. 70 (1414, *h*). Shed antlers. Same locality and collector. *Same history.*

70. 2. 10. 78 (1414, *i*). Frontlet and antlers. Same locality and collector. *Same history.*

70. 2. 10. 79–80 (1414, *f* and *g*). Two frontlets, with antlers. Same locality and collector. *Same history.*

76. 2. 4. 1. Skull and antlers. Formosa.
*Purchased (Zoological Society)*, 1876.

### E.—Cervus unicolor dejeani.

Rusa dejeani, *Pousargues, Bull. Mus. Paris*, 1896, no. 1, p. 2.
Cervus dejeani, *Ward, Records of Big Game*, ed. 2, p. 22, 1896.
Cervus unicolor dejeani, *Lydekker, Deer of All Lands*, p. 156, 1898; *Ward, Records of Big Game*, ed. 6, p. 65, 1910, ed. 7, p. 67, 1914.

Typical locality Sze-chuan, Western China, about 30° north latitude.

Type in Paris Museum.

Stated to be very similar in form and coloration to the Formosan race, but as large as the Indian sambar, from which it differs by the more sombre brown colour, and the longer and more bushy tail. In the type the antlers measure 30½ along the outer curve, and 5½ inches in basal girth.

No specimen in collection.

## F.—Cervus unicolor mariannus.

Cervus mariannus, *Desmarest*, *Mammalogie*, vol. ii, p. 436, 1822; *Cuvier*, *Ossemens Fossiles*, ed. 2, vol. iv, p. 45, pl. v, fig. 30, 1823; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 115, 1827; *J. B. Fischer*, *Synop. Mamm.* p. 453, 1829; *Gray*, *Proc. Zool. Soc.* 1850, p. 232; *Fraser*, *ibid.* 1864, p. 369; *Sclater*, *ibid.* 1870, p. 279; *Brooke*, *ibid.* 1877, p. 53, 1878, p. 901; *Ward*, *Records of Big Game*, ed. 2, p. 1896 (marianus).

Cervus (Rusa) mariannus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 311, 1827.

Cervus labipes, *F. Cuvier*, *Hist. Nat. Mamm.* vol. iv, pl. 420, 1832.

Cervus (Hippelaphus) mariannus, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 180, 1846.

Rusa mariannus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 78, 1872, *Hand-List Ruminants Brit. Mus.* p. 150, 1873 (marianus), partim; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 355, 1873, vol. lxx, pt. 1, p. 304, 1874 (marianna); *Garrod*, *Proc. Zool. Soc.* 1877, p. 17.

Ussa marianus, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 40, 1888.

Typical locality Guam Island, Marianne, or Ladrone, Group.

Type in Paris Museum.

Closely allied to, and perhaps really inseparable from, the next race. Brooke was of opinion that the Marianne deer were originally imported from Luzon, but the evidence is by no means conclusive. The name *mariannus* antedates *philippinus*.

655, *b*. Skull, with antlers. Presumably (like the following specimens) from the Marianne group. Described, with figure of antlers by Brooke, *op. cit.* 1877, p. 56. Total length of skull 11¾ inches; length of antler along outer curve 18 inches, basal girth above burr 5 inches. *No history.*

655, *c*. Skull and antlers. *No history.*

53. 16. 6. 2 (655, *d*). Skull and antlers.
*Purchased* (*Argent*), 1853.

655, *e*. Pair of antlers. *No history.*

64. 10. 1. 2 (655, *f*). Pair of antlers.
*Purchased* (*Cutter*), 1864.

## G.—Cervus unicolor philippinus.

Cervus philippinus, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 147, 1827; *J. B. Fischer*, *Synop. Mamm.* p. 622, 1829; *Pucheran*, *Rev. Zool. Paris*, 1855, p. 49, 1857, p. 481; *Brooke*, *Proc. Zool. Soc.* 1877, p. 51, pl. viii, 1878, p. 901.

Cervus (Stylocerus) philippinus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 319, 1827.

Cervus (Hippelaphus) philippinus, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 179, 1846.

Rusa philippinus, *Gray*, *Knowsley Menagerie*, p. 63, 1850, *Proc. Zool. Soc.* 1850, p. 232, *Cat. Ungulata Brit. Mus.* p. 211, 1852; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxvii, pt. 1, p. 355, 1873, vol. lxx, pt. 1, p. 305, 1874 (philippina); *Cabrera*, *Cat. Met. Mam. Mus. Madrid*, p. 130, 1912; *Hollister*, *Philippine Journ. Sci.* sect. D, vol. vii, p. 40, 1912, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 331, 1913.

Cervus mariannus, *Fraser*, *Proc. Zool. Soc.* 1866, p. 367.

Rusa mariannus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 78, 1872, *Hand-List Ruminants Brit. Mus.* p. 150, 1873 (marianna), partim.

Cervus (Muntjac) philippinus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 94, 1872.

Cervus unicolor philippinus, *Lydekker*, *Deer of All Lands*, p. 157, 1898; *Ward*, *Records of Big Game*, ed. 6, p. 64, 1910, ed. 7, p. 67, 1914.

Typical locality Luzon, Philippine group.

Type in Paris Museum.

Nearly allied to *C. u. swinhoei*, but smaller; height at shoulder about 28 inches; general build stout and massive, with the hind-quarters not specially elevated, and the form that of a small Malay sambar; general colour rich ruddy brown, darkest on back and lightest on the neck; forehead and cheeks rufous fawn; a blackish streak starting from over each eye to form a median line down the face, which is separated by a pale band of fawn from a narrow moustache-like mark on the muzzle; chin white; under-parts uniformly brown; metatarsal gland forming a rufous spot much lighter than the rest of the leg; ears moderate, covered externally with short close-set hairs; antlers very similar to those of

the Malay race, massive, nearly straight, with a long brow-tine, and the inner tine of the terminal fork markedly shorter than the outer one. Skull rather elevated in the nasal region, and the lachrymal vacuities large and triangular.

47. 3. 4. 22 (655, *a*). Pair of antlers, probably referable to this race. Philippines.

*Presented by Admiral Sir Edward Belcher, K.C.B.*, 1847.

2. 3. 19. 2. Head of female in winter coat, mounted. Shows the white chin very distinctly.

*Presented by the Duke of Bedford, K.G.*, 1902

## H.—Cervus unicolor basilanensis.

Melanaxis basilanensis, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 49, 1888.

Rusa basilanensis, *Hollister*, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 332, 1913.

Typical (and only) locality Basilan Island, Philippines.

Apparently nearly allied to, but (according to Hollister) distinct from, *C. u. philippinus*.

No specimen in collection.

## I.—Cervus unicolor barandanus.

Ussa barandanus, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 22, 1888.

Rusa barandanus, *Hollister*, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 331, 1913.

Typical locality Mindoro Island, Philippines.

Insufficiently described, but, according to Hollister, entitled to rank as a distinct form; size approximately the same as in *C. u. philippinus*.

No specimen in collection.

## J.—Cervus unicolor francianus.

Ussa francianus, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 24, 1888.

Rusa francianus, *Hollister*, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 331. 1913.

Typical locality Mindanao Island, Philippines.

Apparently nearly related to *C. u. philippinus*, but at

present insufficiently described. Considerable variation obtains in the size of the cheek-teeth.

No specimen in collection.

## K.—Cervus unicolor nigricans.

Cervus nigricans, *Brooke*, *Proc. Zool. Soc.* 1877, p. 57.

Ussa nigricans, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, pt. 1, p. 31, 1888.

Cervus steerii, *Elliot*, *Field Mus. Zool. Pub.* vol. i, p. 72, 1896, p. 157, 1897.

Cervus (Rusa) nigricans, *Nitsche*, *Studien über Hirsche*, p. 32, 1898.

Cervus unicolor nigricans, *Lydekker*, *Deer of All Lands*, p. 158, 1898; *Ward*, *Records of Big Game*, ed. 6, p. 65, 1910, ed. 7, p. 65, 1914.

Rusa nigricans, *Hollister*, *Philippine Journ. Sci.* sect. D, vol. vii, p. 40, 1912, *Proc. U.S. Nat. Mus.* vol. xli, p. 339, 1913.

Rusa steerei, *Hollister*, *Philippine Journ. Sci.* sect. D, vol. vii, p. 40, 1912.

Typical locality "an unknown island in the Philippines," which is Basilan, the typical locality of *Cervus steerii*.

Smaller than *C. u. philippinus*, the height at the shoulder being about 24 to 26 inches; general build more slender, with the hind-quarters much higher than the withers; general colour blackish brown, slightly tinged with rufous, becoming almost black on the face, neck, and shoulders; no moustache-like markings on muzzle; chin, under-parts, and inner surfaces of thighs varying from dirty white to whitish brown, the white showing most on the front of the thighs; metatarsal gland generally indistinct; ears oval, relatively small, and almost naked externally; antlers moderately stout, somewhat curved forwards, with a short brow-tine, and the hind tine of the terminal fork not much shorter than the front one. Skull much depressed in the nasal region, with the nasal bones in fully adult individuals so expanded as almost or completely to obliterate the lachrymal vacuities. Basal length of skull in a Basilan specimen $8\frac{1}{4}$ inches; length of antlers on outer curve $13\frac{1}{2}$ inches.

This race was named on the evidence of the undermentioned skull and skin of a female from an unknown island in the Philippines, in which the lower portions of the legs are perhaps rather lighter than in other examples, and

the metatarsal gland is indistinctly visible as a light patch. In 1890 the Museum received the Basilan specimen, No. 90. 7. 25. 3, which from the comparatively small size of the antlers, is probably immature; and the only noticable difference between this specimen—which is undoubtedly the same as *C. steerii*—and the type is that in the former the front and outer side of the lower portion of the legs is slightly darker, and shows no distinct light gland-patch. As mounted, it measures 25½ inches at the shoulder, and 27 inches at the rump. In its relatively high rump it accords with Brooke's "crouching aguti-like carriage" of the type; and from comparison with the latter, there can be little or no doubt that both belong to the same race, the nearly naked ears being a conspicuous feature in common.

85. 4. 22. 1. Skull and skin, female. Philippines, probably Basilan. Type. The animal was living in the London Zoological Gardens in 1870; and on its death the present specimens passed into the collection of Sir Victor Brooke, Bart. *Presented by Sir Douglas Brooke, Bart.*, 1885.

85. 4. 22. 3. Skull and antlers. Basilan; collected by A. H. Everett, Esq. *Purchased*, 1885.

85. 4. 22. 4. A similar specimen. Same locality and collector. *Same history.*

15. 4. 22. 5. Another similar specimen. Same locality and collector. *Same history.*

90. 7. 25. 3. Skin, subadult, mounted. Basilan; collected by E. L. Mosely, Esq. *Purchased*, 1890.

## L.—Cervus unicolor nigellus.

Rusa nigellus, *Hollister, Proc. U.S. Nat. Mus.* vol. xlvi, p. 332, 1913.

Typical locality Mount Malindang, at a height of 8,000 feet, Mindanao Island, Philippines.

Type in U.S. National Museum.

Much smaller than the common Mindanao *C. u. francianus*, and apparently nearly related to *C. u. nigricans*, but with smaller skull and cheek-teeth and conspicuous face-markings. General colour dark blackish brown, with two transverse golden brown bands on face, one a little above muffle and the other across forehead; lower lip whitish;

chin blackish; nape and backs of ears black; inner sides of ears buffish white; under-parts nearly black in middle line, passing into ochery buff between limbs; fore-legs with a narrow ochery stripe down inner side. Antler-pedicles very long; length of upper row of cheek-teeth 66 mm.

No specimen in collection.

### M.—Cervus unicolor boninensis.

Cervus (Rusa) unicolor boninensis, *Lydekker*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xv, p. 392, 1905; *Aoki*, *Annot. Zool. Japon.* vol. viii. p. 341, 1913, as a synonym of C. unicolor.

Typical locality Bonin Islands, lying about one degree to the east-south-east of the southern point of Japan, to which, according to Aoki, these deer were introduced by Perry about 1850.

A provisional race of smaller size than *C. u. swinhoei*, and of the approximate dimensions of *C. u. nigricans*, from which it differs by the much lighter colour of the under-parts and limbs—the shanks being nearly white, and the rufous fawn of the flanks being sharply defined from the brown of the back—as well as by the tail being shorter and white beneath. Basal length of female skull $8\frac{3}{4}$ inches.

96. 2. 28. 4. Skull, female. Bonin Island. Type. Shows the proximally expanded nasals, deep lachrymal pits, and small auditory bullæ characteristic of the sambar group. The skull and skin of a male specimen are in the Tring Museum.

*Presented by the Executors of H. Seebohm, Esq.*, 1896.

#### Other Names applied to Rusine Deer.

The following is a list of names (compiled by Hollister, *Philippine Journ. Sci.* sect. D, vol. vii, pp. 41 *et seq.*) applied by Heude to Philippine deer, in addition to those quoted elsewhere in this volume. The specific names are arranged alphabetically, irrespective of the genera to which they were assigned by their author. Hollister remarks that, although many of these names are undoubtedly synonyms, a few may prove valid when a sufficient number of specimens from the typical localities are available for comparison.

Ussa ambrosianus, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, pt. 1, p. 27, 1888.

Typical locality Nueva Ecija, Luzon.

Ussa atheneensis, *Heude*, *op. cit.* vol. iv, pt. 3, p. 138, 1889.

Typical locality Luzon.

Ussa baryceros, *Heude*, *op. cit.* vol. iv, pt. 3, p. 139, 1899.

Typical locality La Laguna and Batangas, Luzon.

Ussa brachyceros, *Heude*, *op. cit.* vol. ii, pt. 1, p. 36, 1888.

Typical locality Batangas, Luzon.

Melanaxis breviceps, *Heude*, *op. cit.* vol. ii, pt. 1, p. 48, 1888.

Typical locality Masbate Island.

Ussa chrysotrichos, *Heude*, *op. cit.* vol. ii, pt. 1, p. 39, 1888.

Typical locality La Laguna and Batangas, Luzon.

Ussa cinereus, *Heude*, *op. cit.* vol. iv, pt. 3, p. 140, 1889.

Typical locality Cebu Island.

Ussa corteanus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 37, 1888.

Typical locality Mariveles, Luzon.

Ussa crassicornis, *Heude*, *op. cit.* vol. ii, pt. 1, p. 23, 1888.

Typical locality Cebu.

Ussa dailliardianus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 32, 1888.

Typical locality Jala-Jala, Laguna, Luzon.

Melanaxis (?) elegans, *Heude*, *op. cit.* vol. ii, pt. 1, p. 49, 1888.

Typical locality Philippine Islands.

Ussa elorzanus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 28, 1888.

Typical locality Bataan Province, Luzon.

Ussa garcianus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 29, 1888.

Typical locality Nueva Ecija, Luzon.

Ussa gonzalinus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 35, 1888.

Typical locality Philippines, probably Luzon.

Ussa gorrichanus, *Heude, op. cit.* vol. ii, pt. 1, p. 21, 1888.

Typical locality Batangas, Luzon.

Ussa guevaranus, *Heude, op. cit.* vol. ii, pt. 1, p. 40, 1888.

Typical locality Mariquina, Luzon.

Ussa guidoteanus, *Heude, op. cit.* vol. ii, pt. 1, p. 29, 1888.

Typical locality Batangas, Luzon.

Ussa hipolitianus, *Heude, op. cit.* vol. ii, pt. 1, p. 39, 1888.

Typical locality La Laguna and Batangas, Luzon.

Ussa longicuspis, *Heude, op. cit.* vol. ii, pt. 1, p. 34, 1888.

Typical locality Philippines, probably Luzon.

Ussa macarianus, *Heude, op. cit.* vol. ii, pt. 1, p. 28, 1888.

Typical locality Nueva Ecija, Luzon.

Ussa maraisianus, *Heude, op. cit.* vol. ii, pt. 1, p. 31, 1888.

Typical locality Jala-Jala, Laguna de Bay, Luzon.

Ussa marzaninus, *Heude, op. cit.* vol. ii, pt. 1, p. 33, 1888.

Typical locality Nueva Ecija and La Laguna, Luzon.

Melanaxis masbatensis, *Heude, op. cit.* vol. ii, pt. 1, p. 47, 1888.

Typical locality Masbate Island.

Ussa michaelinus, *Heude, op. cit.* vol. iv, pt. 3, p. 135, 1899.

Typical locality San Miguel de Murcia, Tarlac, Luzon.

Ussa microdontus, *Heude, op. cit.* vol. ii, pt. 1, p. 34, 1888.

Typical locality Batangas, Luzon.

Ussa nublanus, *Heude, op. cit.* vol. ii, pt. 1, p. 24, 1888.

Typical locality, La Laguna, Luzon.

Ussa ramosianus, *Heude, op. cit.* vol. ii, pt. 1, p. 26, 1888.

Typical locality Nueva Ecija, Luzon.

Ussa rosarianus, *Heude, op. cit.* vol. ii, pt. 1, p. 30, 1888.

Typical locality Nueva Ecija, Luzon.

Ussa roxasianus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 33, 1888.

Typical locality Batangas, Luzon.

Ussa rubiginosus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 38, 1888.

Typical locality Bataan and Nueva Ecija, Luzon.

Sikelaphus soloënsis, *Heude*, *op. cit.* vol. ii, pt. 3, p. 147, 1894.

Typical locality Sulu.

Ussa spatharius, *Heude*, *op. cit.* vol. ii, pt. 1, p. 25, 1888.

Typical locality La Laguna, Luzon.

Ussa telesforianus, *Heude*, *op. cit.* vol. ii, p. 1, p. 36, 1888.

Typical locality Batangas (?), Luzon.

Ussa tuasoninus, *Heude*, *op. cit.* vol. ii, p. 1, p. 25, 1888.

Typical locality Batangas, Luzon.

Ussa verzosanus, *Heude*, *op. cit.* vol. ii, p. 1, p. 37, 1888, vol. iv, pt. 3, p. 134, 1894.

Typical locality Nueva Ecija, Luzon.

Ussa vidalinus, *Heude*, *op. cit.* vol. iv, pt. 3, p. 136, 1899.

Typical locality San Miguel de Murcia, Tarlac, Luzon.

Ussa villemerianus, *Heude*, *op. cit.* vol. iv, pt. 3, p. 136, 1899.

Typical locality San Miguel de Murcia, Tarlac, Luzon.

The following names have been applied to members of the sambar-rusa group from countries other than the Philippines :—

Sambar curvicornis, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, pt. 1, p. 42, 1888. Cochin-China.

Sambar longicornis, *Heude*, *op. cit.* vol. ii, pt. 1, p. 42, 1888. Cochin-China.

Sambar outreyanus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 42, 1888. Cochin-China.

Sambar planidens, *Heude*, *op. cit.* vol. ii, pt. 1, p. 43, 1888. Cochin-China.

Sambar colombertinus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 43, 1888. Cochin-China.

Sambar combalbertinus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 43, 1888. Cochin-China.

Sambar lignarius, *Heude*, *op. cit.* vol. ii, pt. 1, p. 44, 1888. Cochin-China.

Sambar lemeanus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 44, 1888. Cochin-China.

Sambar errardianus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 45, 1888. Cochin-China.

Sambar joubertianus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 45, 1888. Cochin-China.

Sambar latidens, *Heude*, *op. cit.* vol. ii, pt. 1, p. 45, 1888. Cochin-China.

Sambar planiceps, *Heude*, *op. cit.* vol. ii, pt. 1, p. 45, 1888. Cochin-China.

Sambar officialis, *Heude*, *op. cit.* vol. ii, pt. 1, p. 46, 1888. Cochin-China.

Sambar simoninus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 46, 1888. Cochin-China.

Sambar brachyrinus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 46, 1888. Cochin-China.

Sambar verutus, *Heude*, *op. cit.* vol. ii, pt. 1, p. 46, 1888. Cochin-China.

Hippelaphus hamiltonianus, *Heude*, *op. cit.* vol. iii, p. 49, 1896. Sandakan.

Hippelaphus macassaricus, *Heude*, *op. cit.* vol. iii, p. 50, 1896. Macassar.

Hippelaphus menadensis, *Heude*, *op. cit.* vol. iii, p. 50, 1896. Menado.

Hippelaphus floresianus, *Heude*, *op. cit.* vol. iii, p. 92, 1896. Flores.

Hippelaphus buruensis, *Heude*, *op. cit.* vol. iii, p. 93, 1896. Buru.

Hippelaphus noëvellianus, *Heude*, *op. cit.* vol. iii, p. 94, 1896. Buru.

### 4. Subgenus **RUCERVUS.**

Rucervus, *Hodgson*, *Ann. Mag. Nat. Hist.* ser. 1, vol. i, p. 154, 1838; *Brooke*, *Proc. Zool. Soc.* 1878, p. 905; *Lydekker*, *Deer of All Lands*, p. 188, 1898.

Panolia, *Gray*, *List Mamm. Brit. Mus.* p. 180, 1843.

Recervus, *Gray*, *List. Osteol. Brit. Mus.* p. 65, 1847, errorim.

Recurvus, *Jäger and Bessels*, *Petermann's Mittheil.* vol. xvi, p. 87, 1870, errorim.

Rucercus, *Trouessart*, *Cat. Mamm.* p. 875, 1898, errorim.

Large deer, with flattened or rounded antlers, in which both the bez (second) and third tines are wanting, the beam dichotomously forked, and one or both branches again forked, so that the number of tines is typically at least four, and may be many more, the brow-tine forming either a right angle or a continuous curve with the beam; coat generally

almost or quite uniformly coloured, without a light rump-patch; neck maned; ears large; face long; tail short; bare area of muzzle ascending some distance above nostrils; face-glands moderate, and not capable of complete eversion; metatarsal glands small or wanting; hind-pasterns as in preceding subgenus; upper canines small; upper molars with a small additional column on the inner side; young usually spotted; skull relatively narrow, with the auditory bullæ on under surface moderately inflated.

The distributional area includes a large portion of the mainland of south-eastern Asia, together with the island of Hainan.

The species are distinguishable as follows:—

A. Brow-tine of antlers more or less differentiated from beam.
  *a*. Beam of antlers undivided for a considerable distance above origin of brow-tine, which is not forked ..... *C.* (*R.*) *duvaucelli*.
  *b*. Beam of antlers dividing a short distance above origin of brow-tine, which is frequently forked ..... *C.* (*R.*) *schomburgki*.

B. Brow-tine of antlers continuous with beam... *C.* (*R.*) *eldi*.

## IX. CERVUS (RUCERVUS) DUVAUCELI.

Cervus duvaucelii,* *Cuvier*, *Ossemens Fossiles*, ed. 3, vol. iv, p. 505, 1825; *J. B. Fischer*, *Synop. Mamm.* p. 452, 1829; *Anon*, *Journ. Asiat. Soc. Bengal*, vol. v, p. 240, 1836; *Selater*, *Trans. Zool. Soc.* vol. vii, p. 346, 1871; *Brooke*, *Proc. Zool. Soc.* 1878, p. 905; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 179, 1891; *Flower and Lydekker*, *Study of Mammals*, p. 320, 1891; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 538, 1891; *Lydekker*, *Horns and Hoofs*, p. 304, 1893, *Deer of All Lands*, p. 189, pl. xiv, 1898, *Proc. Zool. Soc.* 1899, p. 829, *Great and Small Game of India*, *etc.* p. 228, 1900, *Game Animals of India*, *etc.* p. 245, 1907; *Ward*, *Records of Big Game*, ed. 2, p. 13, 1896; *Bentham*, *Asiat. Horns and Antlers Ind. Mus.* p. 85, 1908.

Cervus bahrinja, *Hodgson*, *Proc. Zool. Soc.* 1834, p. 99.

Cervus elaphoides, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. iv, p. 648, 1835.

Cervus (Rucervus) elaphoides, *Hodgson*, *Ann. Mag. Nat. Hist.* ser. 1, vol. i, p. 154, 1838.

Cervus dimorphe, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. xii, p. 807, 1843.

Axis (?) duvaucellii, *Gray*, *List Mamm. Brit Mus.* p. 178, 1843.

* Variously rendered as *duvauceli* and *duvaucelli*.

Cervus (Hippelaphus) duvaucelii, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 178, 1846.

Rucervus duvaucelii, *Hodgson, Journ. Asiat. Soc. Bengal*, vol. xvi, p. 689, 1847; *Gray, Proc. Zool. Soc.* 1850, p. 230, *Cat. Ungulata Brit. Mus.* p. 203, 1852, *Cat. Ruminants Brit. Mus.* p. 76, 1872, *Hand-List Ruminants Brit. Mus.* p. 145, 1873; *Blyth, Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 150, 1863, *Proc. Zool. Soc.* 1867, p. 835; *Anderson, Journ. Asiat. Soc. Bengal*, vol. xxxvi, pt. 2, p. 185, note, 1868; *Blanford, ibid.* pp. 197 and 199, 1868; *Jerdon, Mamm. India*, p. 254, 1867; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 356, 1873, vol. lxx, pt. 1, p. 324, 1874; *Sterndale, Mamm. India*, p. 510, 1884; *Percy, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 264, 1894.

Rucervus duvaucellii, *Gray, List Osteol. Brit. Mus.* p. 65, 1847; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 259, 1862.

Cervus rucervos, *Gray, Knowsley Menagerie*, p. 40, 1850.

Rusa dimorpha, *Gray, Knowsley Menagerie*, p. 62, 1850; *Fitzinger, Sitzber. k. Ak. Wiss.* vol. lxviii, pt. 1, p. 355, 1873.

Cervus eucladoceros, *Falconer's Pal. Mem.* vol. i, p. 587, 1868.

Cervus (Rucervus) duvauceli, *Ward, Records of Big Game*, ed. 6, p. 79, 1910, ed. 7, p. 54, 1914; *Pocock, Proc. Zool. Soc.* 1910, p. 493; *Lydekker, Cat. Hume Bequest Brit. Mus.* p. 36, 1913.

Barasingha; Swamp-Deer.

Type of *Rucervus*.

Typical locality plains of Peninsular India.

Height at shoulder from 3 feet 8 inches to 3 feet 10 inches; build stout and tall; coat moderately fine, and somewhat woolly; muzzle long and slender; antlers (fig. 18) smooth and flattened, with a long brow-tine usually rising almost at a right angle to beam; above the brow-tine the beam remains undivided for about half its length, when it splits into a regular fork, of which each branch is usually again simply forked, although the outer branch may be much longer than the inner one, and bear three or more tines; small snags frequently developed on upper surface of brow-tine, although "sports" at its junction with the beam seldom occur, and the brow-tine is never forked; metatarsal gland and tuft wanting; general colour in summer bright rufous brown, frequently, or usually, with a broad brown line down the middle of the back, bordered by a line of white spots on each side, and more or less faint traces of other spots; throat, inner sides of thighs, and under-parts white or whitish; lower surface of the tail pure white; in winter upper-parts yellowish brown, and under-parts paler; in

females colour lighter at all seasons; young fully spotted with white. The ears are filled internally with long white hairs; and the naked portion of the muzzle is slaty. Good antlers measure from 34 to 41 inches along the outer curve, with a

Fig. 18.—Head of Swamp-Deer (*Cervus* [*Rucervus*] *duvauceli*). The nearly continuous sweep formed by the brow-tine and the beam is a feature in which this head approximates to the Thamin.

From Lydekker, *Proc. Zool. Soc.* 1899.

basal girth of from $4\frac{7}{8}$ to $6\frac{1}{4}$, and a tip-to-tip interval of from 20 to 43 inches.

The range is restricted to India, not extending eastward of the Bay of Bengal or to Ceylon. Along the foot of the Himalaya it embraces the tract from Upper Assam in the east to the Kyarda Dun west of the Jumna, Assam, a few localities in the Indo-Gangetic plain from the Eastern

Sandarbans to Bahawalpur, Rohri in Upper Sind, and parts of the extensive area lying between the Ganges and Godaveri valleys as far eastwards as Mandla. The species is abundant in portions of the upper Narbada Valley, as well as the neighbourhood of Bastar to the southward: in the Central Provinces its range corresponds with that of the red jungle-fowl, both species being confined to the tracts covered with sal-forest.

45. 1. 8. 128. Skull and antlers. Nepal.
*Presented by B. H. Hodgson, Esq.*, 1845.

45. 1. 8. 129. Skull and antlers. Same locality.
*Same history.*

45. 1. 8. 130. Frontlet and antlers. Same locality.
*Same history.*

45. 1. 8. 131. Frontlet and antlers. Same locality.
*Same history.*

45. 1. 8. 200. Skin, immature female. Same locality.
*Same history.*

45. 1. 8. 271. Skull, with antlers, and skin. Nepal (sal-forest). Type of *Cervus dimorphe*. *Same history.*

50. 7. 9. 13. Skin, mounted, and skull (50. 8. 30. 4). India. An earlier skull (No. 694, *d*) has been put in the skin. *Presented by the Earl of Derby*, 1850.

55. 12. 24. 399. Skin, female. India.
*Same donor*, 1855.

694, *b*. Skull and antlers. India. *No history.*

694, *i*. Skull, immature. India. (In Geological Department.) *No history.*

63. 5. 28. 3. Skull and antlers. Himalaya.
*Purchased (Zoological Society)*, 1863.

63. 12. 3. 7. Skin, young, formerly mounted. Zoological Gardens. *Same history.*

79. 11. 21. 38. Frontlet and horns. India.
*Transferred from India Museum*, 1879.

79. 11. 21. 39. Frontlet and horns. India.
*Same history.*

79. 11. 21. 40. Frontlet and antlers. Upper India; collected by Gen. T. Hardwicke. *Same history.*

84. 4. 14. 1. Skeleton, female. Assam; collected by G. P. Sanderson, Esq. *Purchased*, 1884.

84. 4. 14. 2. Skeleton, female. Same locality and collector. *Same history.*

694, *h*. Skeleton and antlers. India.

*Purchased* (*Zoological Society*).

87. 2. 9. 4. Frontlet and antlers. India; collected by A. Grote, Esq. *Presented by Mrs. Stirling*, 1887.

* * * *. Frontlet and antlers. India. *No history.*

88. 3. 20. 22. Skull and antlers. India.

*Presented by R. Lydekker, Esq.*, 1888.

91. 8. 7. 8. Skull and antlers. Kheri district, Oudh.

*Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 9. Skull and antlers. Bramaputra Valley, Gowhatti, Assam; collected by Mr. R. Adam. *Same history.*

91. 8. 7. 10. Frontlet and antlers. Gowhatti.

*Same history.*

91. 8. 7. 11. Skull and antlers, immature. Baraitch district, Oudh. *Same history.*

5. 11. 30. 1. Skin, mounted. Central Provinces.

*Purchased*, 1905.

12. 10. 31. 5. Skull and antlers. Gowhatti. Neither this nor the following specimen has antlers sufficiently large to be included in Ward's list.

*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

12. 10. 31. 6. Skull and antlers. Kheri district.

*Same history.*

14. 3. 31. 2. Skull and antlers. Dehra Dun; collected by R. H. W. Dunlop, Esq., about 1860. Length of antlers 34½, basal girth 6, tip-to-tip interval 33½ inches.

*Presented by Major A. Wallace-Dunlop*, 1914.

## X. CERVUS (RUCERVUS) SCHOMBURGKI.

Cervus (Rucervus) schomburgki, *Blyth*, *Proc. Zool. Soc.* 1863, p. 155, 1867, p. 835; *Ward*, *Records of Big Game*, ed. 6, p. 75, 1910, ed. 7, p. 57, 1914.

Cervus schomburgki, *Sclater*, *Trans. Zool. Soc.* vol. vii, p. 349, 1871; *Brooke*, *Proc. Zool. Soc.* 1876, p. 304, 1878, p. 905; *Flower and Lydekker*, *Study of Mammals*, p. 320, 1891; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 180, 1891; *Lydekker*, *Horns and Hoofs*, p. 307, 1893, *Deer of All Lands*, p. 193, 1898, *Great and Small Game of India, etc.* p. 230, 1900, *Game Animals of India, etc.* p. 248, 1907; *Ward*, *Records of Big Game*, ed. 2, p. 15, 1896; *Bentham*, *Asiat. Horns and Antlers Ind. Mus.* p. 88, 1908.

Rucervus cambojensis, *Gray, Cat. Ruminants Brit. Mus.* p. 76, 1872, *Hand-List Ruminants Brit. Mus.* p. 145, 1873.

Rucervus schomburgkii, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxix, pt. 1, p. 64, 1879.

Typical locality Siam.

Height at shoulder about 3 feet 5 inches; coat in winter rather long and coarse; general colour uniform brown,

Fig. 19.—Skull and Antlers of Schomburgk's Deer (*Cervus* [*Rucervus*] *schomburgki*).

From a photograph lent by Messrs. Rowland Ward, Ltd.

darkest on nose and the upper surface of tail, and lightest on cheeks and flanks; under-parts, under surface of tail, and lower lip whitish; a tinge of rufous on upper lip, back of head, and limbs; hair on front of lower part of fore-legs elongated into a fringe; metatarsal gland not described; antlers (fig. 19) large, complex, smooth, and polished; the

brow-tine very long, frequently forked, and arising nearly at a right angle to beam, the latter very short and more or less laterally compressed, then forking dichotomously, with each of the main branches about equally developed, and again forking in a similar manner, to terminate in long cylindrical tines; in immature antlers hind branch of main fork less developed than front one.

Good antlers measure from 27 to 33 inches in length along the front curve, with a basal girth of from $4\frac{1}{2}$ to 6, and a tip-to-tip interval of from $9\frac{1}{2}$ to $28\frac{3}{8}$ inches.

The range, according to W. L. Sclater and Bentham, includes Yun-nan.

*Cervulus cambojensis*, described from a frontlet and antlers, with part of the head-skin, from Cambodia, was identified by its describer (Gray) with this species, in his 1872 *Catalogue;* it really belongs to *Cervus unicolor equinus*, under which heading it is entered above (No. 61. 4. 12. 18).

65. 11. 2. 3. Frontlet and antlers. Siam; collected by Sir R. Schomburgk. *Purchased* (*Stevens*), 1865.

65. 11. 2. 4. Pair of antlers. Siam; same collector. *Same history.*

67. 8. 20. 1. Pair of antlers. Siam; collected by E. Blyth, Esq. *Purchased*, 1867.

67. 8. 20. 2. Pair of antlers. Same locality and collector. *Same history.*

67. 8. 20. 3. Pair of antlers. Same locality and collector. *Same history.*

91. 12. 2. 1–2. Two pairs of antlers. Siam; presented to the Science and Art Department by the Siamese Embassy. Co-types; figured *Proc. Zool. Soc.*, 1863.

*Transferred from the Science and Art Department*, 1891.

8. 3. 17. 5. Skull and antlers (fig. 19). Siam. The "record" specimen. Length of antlers on outside curve 33, basal girth $5\frac{3}{4}$, tip-to-tip interval $17\frac{1}{4}$ inches.

*Presented by J. Rowland Ward, Esq.*, 1908.

## XI. CERVUS (RUCERVUS) ELDI.

(?) Cervus smithi, *Gray, Proc. Zool. Soc.* 1837, p. 45.

Cervus eldii,* *Güthrie, Calcutta Journ. Nat. Hist.* vol. ii, p. 417, 1842; *Beavan, Proc. Zool. Soc.* 1867, p. 759; *Blyth, ibid.* 1867, p. 837; *Selater, Trans. Zool. Soc.* vol. vii, p. 348, 1871; *Brooke, Proc. Zool. Soc.* 1878, p. 906; *Flower and Lydekker, Study of Mammals*, p. 320, 1891; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 180, 1891; *Blanford, Fauna Brit. India, Mamm.* p. 541, 1891; *Lydekker, Horns and Hoofs*, p. 308, 1893, *Deer of All Lands*, p. 195, pl. xv, 1898, *Great and Small Game of India, etc.* p. 234, 1900, *Game Animals of India, etc.* p. 252, 1907; *Evans, Journ. Bombay Nat. Hist. Soc.* vol. ix, p. 326, 1895; *Ward, Records of Big Game*, ed. 2, p. 16, 1896; *Bentham, Asiat. Horns and Antlers Ind. Mus.* p. 90, 1908.

Panolia acuticornis, *Gray, List Mamm. Brit. Mus.* p. 180, 1843; *Cantor, Journ. Asiat. Soc. Bengal*, vol. xv, p. 72, 1846.

Cervus lyratus, *Schinz, Synop. Mamm.* vol. ii, p. 395, 1845.

Dama acuticornis, *Reichenbach, Säugethiere*, vol. iii, p. 16, 1845.

Panolia eldi,† *Gray, Cat. Hodgson Collect. Brit. Mus.* p. 34, 1846, *List Osteol. Brit. Mus.* p. 66, 1847, *Proc. Zool. Soc.* 1850, p. 229, *Cat. Ungulata Brit. Mus.* p. 202, 1852, *Cat. Ruminants Brit. Mus.* p. 75, 1872, *Hand-List Ruminants Brit. Mus.* p. 144, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 259, 1862; *Blyth, Journ. Asiat. Soc. Bengal*, vol. xxx, p. 193, 1862, vol. xxxi, p. 334, 1863, *Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 149, 1863, *Proc. Zool. Soc.* 1867, p. 835, *Mamm. and Birds Burma*, p. 45, 1875; *Beavan, Journ. Asiat. Soc. Bengal*, vol. xxxvi, pt. 2, p. 175, 1868; *Swinhoe, Proc. Zool. Soc.* 1869, p. 652; *Sterndale, Mamm. India*, p. 511, 1884; *Percy, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 268, 1894.

Panolia frontalis, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 352, 1873, vol. lxix, pt. 1, p. 592, 1874.

Rucervus eldi, *Garrod, Proc. Zool. Soc.* 1877, p. 17; *Percy, Big Game Shooting* (*Badminton Libr.*), vol. ii, p. 268, 1894.

Cervus (Rucervus) eldi, *Ward, Records of Big Game*, ed. 6, p. 77, 1910, ed. 7, p. 58, 1914; *Lydekker, Cat. Hume Bequest Brit. Mus.* p. 36, 1913.

Cervus (Panolia) eldi, *Pocock, Proc. Zool. Soc.* 1910, p. 944.

Hthamin, Thamin, or Thameng (Burmese); Sangnai (Manipuri) Eld's Deer or Brow-antlered Deer.

Type of *Panolia*.

Typical locality Pegu, Lower Burma.

Height at shoulder about 3 feet 9 inches; coat coarse shaggy in winter, and long and thickened about the neck in the males; antlers (fig. 20) rounded and rugose, with a long

* Modified by later writers to *eldi*.

† Misprinted *eedi* in Gray's earlier lists.

curved brow-tine, forming a continuation of the curve of the beam, which is set at right angles to the pedicle; the beam unbranched for a considerable distance, curving backwards, then outwards and finally forwards, after which it is dichotomously forked; the outer branch of the terminal fork more complex than the inner one, the number of terminal points varying from two or three to at least eight or ten; one or more prominent snags usually developed at the junction of the brow-tine with the beam; the curve of the two antlers usually more or less asymmetrical: colour in

Fig. 20.—Head of Thamin (*Cervus* [*Rucervus*] *eldi*).

winter typically dark brown above, and white below, sometimes with a white mark above the eye; in winter fawn-coloured above and pale brown beneath; females paler rufous fawn; new-born young generally spotted on the rump with white; in a more rufous phase spots persist till a late period; metatarsal gland represented by a tuft of hairs paler than those of the rest of the leg, and a patch of underlying glandular skin.

Fine antlers measure from 34 to 42 inches along the outer curve, with a basal girth of from 4 to 6¼, and a tip-to-tip interval of from 21¼ to 31½ inches.

The range includes low alluvial tracts, from the valley of Manipur in the north, southwards through Burma and the Malay Peninsula, and eastwards to southern Siam, Cambodia, the island of Hainan, and Formosa.

The three following races have been named:—

A. Antlers with the main termination not markedly flattened, few snags on hind edge, and the brow-tine long.
  *a*. Under surface of hind-pasterns hairy..... *C. e. eldi.*
  *b*. Under surface of hind-pasterns horny..... *C. e. frontalis.*
B. Antlers with the main termination markedly flattened, numerous snags on sharp hind edge, and the brow-tine short..... *C. e. siamensis.*

## A.—Cervus eldi eldi.

Cervus eldi typicus, *Lydekker*, *Deer of All Lands*, p. 200, 1898, *Game Animals of India, etc.* p. 253, 1907; *Ward*, *Records of Big Game*, ed. 6, p. 77, 1910, ed. 7, p. 58, 1914.

Typical locality Pegu, Lower Burma, whence the range apparently extends southwards into the Malay Peninsula.

General characters those of the species.

Antlers from the Malay Peninsula and Mergui are stated by Blyth to be smaller than those from Manipur and Burma, frequently with two or three additional snags on the brow-tine, which may indicate the existence of a distinct race in the southern districts.

According to a writer in *The Indian Field*,* the Burmese recognise three distinct types of thamin stags, severally termed wet-thamin (= pig-thamin), chywe-thamin (= buffalo-thamin), and nwa-thamin (= cow-thamin). In the first the colour is dark drab above, with a narrow dark spinal stripe, and an abundant throat-ruff; the second is a taller and more slender stag, without a throat-ruff; while the third is still more slight and graceful in build, lighter in colour and spotted, with a softer coat, and smaller antlers. These differences are probably due mainly to age.

45. 1. 8. 126. Frontlet and antlers. Locality unknown. *Presented by B. H. Hodgson, Esq.*, 1845.

45. 1. 8. 127. Frontlet and antlers. Locality unknown. *Same history.*

* Vol. xvii, p. 60, 1910.

695, *a*. Frontlet and antlers. Locality unknown.
*No history.*

695, *f*. Frontlet and antlers. Locality unknown.
*No history.*

695, *g*. Frontlet and antlers. Locality unknown.
*Purchased (Warwick).*

695, *w*. Frontlet and antlers (in Geological Department). Locality unknown. *No history.*

46. 4. 29. 10. Skull and antlers. Burma (?).
*Purchased*, 1846.

46. 4. 29. 11. Skull and antlers. Burma (?).
*Same history.*

66. 4. 25. 4. Skeleton, wanting skull. Probably Burma.
*Purchased (Zoological Society)*, 1866.

68. 12. 29. 9. Skin. Probably Burma.
*Purchased (Zoological Society)*, 1868.

79. 11. 21. 36, *a*. Frontlet and antlers. Locality unknown. *Transferred from India Museum*, 1879.

87. 2. 9. 5. Skull and antlers. Locality unknown; collected by A. Grote, Esq. *Presented by Mrs. Stirling*, 1887.

87. 2. 9. 6. Frontlet and antlers. Locality unknown; same collector. *Same history.*

91. 8. 7. 12. Skull and antlers. Thatone, Tenasserim; collected by W. Davison, Esq.
*Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 15. Skull and antlers. Same locality and collector. *Same history.*

94. 12. 19. 1–5. Five skulls, with antlers. Monywa district, lower Chindwin Valley, Upper Burma.
*Presented by C. F. Gilbert, Esq.*, 1894.

96. 6. 29. 2. Head, mounted. Burma.
*Purchased (Ward)*, 1896.

0. 7. 23. 1. Skin, mounted. Burma.
*Presented by Major H. G. Evans*, 1900.

12. 10. 31. 8. Skull and antlers. Thatone; collected by W. Davison, Esq.
*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

## B.—Cervus eldi frontalis.

Cervus (Rusa) frontalis, *McClelland, Calcutta Journ. Nat. Hist.* vol. iii, p. 539, pls. xiii and xiv, 1843; *Blyth, Journ. Asiat. Soc. Bengal*, vol. xxviii, p. 296, 1859.

Cervus (Hippelaphus) frontalis, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 320, 1846.

Cervus eldi cornipes, *Lydekker, Nature*, vol. lxiv, p. 257, 1901, *Game Animals of India, etc.* p. 254, 1907; *Ward, Records of Big Game*, ed. 6, p. 77, 1910, ed. 7, p. 58, 1914.

Typical locality the Manipur Valley, which is practically one continuous swamp.

Antlers apparently indistinguishable from those of typical race; hind-pasterns longer, with the whole under surface horny (instead of hairy), and applied to the ground in walking.

79. 11. 21. 36. Frontlet and antlers. Manipur; collected by Dr. J. McClelland. Co-type.

*Transferred from India Museum*, 1879.

91. 8. 7. 13–14. Two skulls, with antlers. Manipur.

*Presented by A. O. Hume, Esq., C.B.*, 1891.

1. 7. 13. 1. Hind-foot, mounted. Manipur. Type of *C. cornipes.* *Presented by Major C. S. Cumberland*, 1901.

12. 10. 31. 7. Skull and antlers. Manipur; collected by Mr. Hume. In this specimen, which stands No. 16 in Ward's 1910 list, the measurements of the antlers are as follows: length on outside curve $38\frac{1}{4}$, girth $6\frac{1}{4}$, tip-to-tip 24, widest inside span $30\frac{3}{4}$ inches.

*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

## C.—Cervus eldi siamensis, nom. n.

Panolia platyceros, *Gray, List Mamm. Brit. Mus.* p. 181, 1843, *Cat. Ungulata Brit. Mus.* p. 203, 1852; *Blyth, Proc. Zool. Soc.* 1867, p. 843, as a variety of *P. eldi;* nec Cervus platyceros, *Cuvier*, 1798.

Panolia platycercus, *Gray, Cat. Ruminants Brit. Mus.* p. 75, 1872, *Hand-List Ruminants Brit. Mus.* p. 144, 1873, errorim.

Cervus eldi platyceros, *Lydekker, Deer of All Lands*, p. 200, 1898, *Game Animals of India, etc.* p. 253, 1907; *Ward, Records of Big Game*, ed. 6, p. 77, 1910, ed. 7, p. 58, 1914; *Gairdner, Journ. Nat. Hist. Soc. Siam*, vol. i, p. 113, 1914.

Panolia eldi platyceros, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xxii, p. 468, 1906.

Typical locality (southern) Siam, the range including Cambodia, apparently Hainan, and perhaps Formosa.

Antlers with the main termination much flattened, a number of small snags on the sharp hind edge, and the brow-tine relatively short; general colour reddish at all seasons, with spots along middle of back, and in some cases also on sides.

Although there is some doubt as to the place of origin of the type of *Panolia platyceros* (No. 695, *h*), it presents all the characteristics of Siamese antlers.

695, *h*. Single antler. Siam (?). Type; figured by Blyth, *Proc. Zool. Soc.*, 1867, p. 841, figs. 22 and 23. In Gray's *Catalogue of Ungulata* the locality was given as India, but in the Museum copy it is altered, in Gray's own handwriting, to Siam; and in the *Catalogue of Ruminants* Siam appears as the place of origin. *Purchased (Warwick).*

65. 11. 2. 1. Skull and antlers. Siam. Figured by Blyth, *op. cit.* figs. 20 and 21.
*Presented by Sir R. Schomburgk*, 1865.

65. 11. 2. 2. Frontlet and antlers. Siam. *Same history.*

8. 11. 1. 18. Skull and antlers. Nha Trang, Annam; collected by Dr. J. Vassal. *Purchased*, 1908.

The reference of the following specimens—more especially those from Formosa—to the present race is provisional.

70. 2. 10. 27. Skin, young. Hainan; collected by R. Swinhoe, Esq. *Purchased*, 1870.

70. 2. 10. 28. Skin, young. Same locality and collector. *Same history.*

70. 2. 10. 29. Skin. Same locality and collector. *Same history.*

70. 2. 10. 32. Skin. Same locality and collector. *Same history.*

70. 2. 10. 71–75. Five frontlets, with antlers. Formosa; same collector. *Same history.*

70. 2. 10. 76. Single antler. Same locality and collector. *Same history.*

### 5. Subgenus SIKA.

Sika, *Sclater*, *Proc. Zool. Soc.* 1870, p. 115; *Gill*, *Arrangement Fam. Mamm.* p. 80, 1872; *Heude Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 17, 1888.

Pseudaxis, *Gray, Cat. Ruminants Brit. Mus.* p. 70, 1872; *Brooke, Proc. Zool. Soc.* 1878, p. 907; *Lydekker, Deer of All Lands*, p. 110, 1898; *Pocock, Proc. Zool. Soc.* 1910, p. 943.

Elaphoceros, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. i, p. 602, 1873, vol. lxix, pt. 1, p. 596, 1874.

Sikaïllus, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. iv, p. 98, 1898.

Sikaïlus, *Heude, op. cit.* p. 110, 1898, errorim.

Sica, *Trouessart, Cat. Mamm.* p. 878, 1898.

Medium-sized or rather small deer, nearly related to the next (typical) subgenus, but with the antlers smaller and simpler than is usually the case in that group, more or less flattened, and generally 4-tined (occasionally 5-tined), with a third, but no bez-tine; face-glands shallower; coat of adult spotted with yellow or white, at least in summer, and a pure white area bordered with black in the region of the tail, which is also white and black, and considerably longer than in the typical subgenus; young more or less distinctly white-spotted; metatarsal tuft generally whitish; throat maned; head shorter than in preceding group; ears moderate; bared portion of muzzle larger than in preceding group, extending well on to the upper surface of the face, and being very wide between nostrils and upper lip; hind-pasterns as in typical subgenus; rudimentary upper canines present; upper molars of the general type of those of the typical group. In the growing antlers the "velvet" is deep red, passing into black at the tips of the tines, and matching the summer coat; the white hairs in the neighbourhood of the tail are erectile.

At the present day the group is confined to the south-eastern portion of the Eastern Holarctic and some adjacent parts of the Oriental Region, but it was apparently represented in Europe during the Pliocene section of the Tertiary period.

The three species are recognisable as follows:—

A. Size smaller.
   *a*. Spots disappearing in winter; metatarsal tuft white ..... *Cervus nippon.*
   *b*. Spots persistent in winter; metatarsal tuft apparently not white ..... *Cervus taouanus.*

B. Size larger, metatarsal gland, except in centre, coloured like rest of shank ..... *Cervus hortulorum.*

## XII. CERVUS (SIKA) NIPPON.

Cervus nippon, *Temminck*, *Fauna Japonica*, *Introduction*, p. xxii, 1837, teste *Stejneger*, *Science*, vol. xxii, p. 402, 1905.

Cervus sika, *Temminck*, *Fauna Japonica*, p. 54, pl. xvii, 1845; *Gray*, *Proc. Zool. Soc.* 1850, p. 228; *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xxix, p. 92, 1860; *Sclater*, *Proc. Zool. Soc.* 1860, p. 377. *Trans. Zool. Soc.* vol. vii, p. 346, 1871; *Garrod*, *Proc. Zool. Soc.* 1877, p. 16; *Brooke*, *ibid.* 1878, p. 908; *Powerscourt*, *ibid.* 1884, p. 208; *Heude*, *Bull. Soc. Philom.* ser. 7, vol. vi, p. 183, 1882; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 39, 1891; *Flower and Lydekker*, *Study of Mammals*, p. 321, 1891; *Ward*, *Records of Big Game*, ed. 2, p. 21, 1896; *Mivart*, *Proc. Zool. Soc.* 1897, p. 204; *Thomas*, *ibid.* 1908, p. 54; *Bentham*, *Asiat. Horns and Antlers Ind. Mus.* p. 68, 1908; *Aoki*, *Annot. Zool. Japon.* vol. viii, p. 341, 1913.

Cervus (Hippelaphus) japonicus, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 177, 1846.

Cervus syka, *Pucheran*, *Arch. Mus. Paris*, vol. vi, p. 398, 1852.

Rusa japonica, *Gray*, *Ann. Mag. Nat. Hist.* ser. 3, vol. vi, p. 218, 1860, *Proc. Zool. Soc.* 1861, p. 236; *Sclater*, *Proc. Zool. Soc.* 1860, p. 365, 1862, p. 150 (javonica).

Cervus (Sika) sika, *Sclater*, *Proc. Zool. Soc.* 1870, p. 115.

Pseudaxis sika, *Gray*, *Cat. Ruminants Brit. Mus.* p. 72, 1872, *Hand-List Ruminants Brit. Mus.* p. 142, 1873; *Cabrera*, *Cat. Met. Mam. Mus. Madrid*, p. 130, 1912.

Elaphoceros sika, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 352, 1873, vol. lxix, pt. i, p. 602, 1874.

Cervus euopis, *Swinhoe*, *Proc. Zool. Soc.* 1874, p. 151; *Brooke*, *ibid.* 1878, p. 908.

Axis sika, *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 93, 1878.

Cervus frinianus, p. 185, gracilis, p. 185, lacrymosus, p. 186, ignotus, p. 186, andreanus, p. 186, joretianus, p. 187, devilleanus, p. 187, cyclorhinus, p. 188, hyemalis, p. 188, *Heude*, *Bull. Soc. Philom.* ser. 7, vol. vi, p. 183, 1882.

Cervus sica, *Lydekker*, *Horns and Hoofs*, p. 284, 1893, *Proc. Zool. Soc.* 1897, p. 39, *Deer of All Lands*, p. 111, 1898, *Great and Small Game of Europe*, *etc.* p. 229, 1901.

Sika porcorelianus, p. 149, brachyrhinus, p. 151, andreanus, p. 152, grilloanus, p. 154, dugenneanus, p. 156, joretianus, p. 157, oxycephalus, p. 158, frinianus, p. 159, cycloceros, p. 160, surdescens, p. 161, lacrymans, p. 162, arietinus, p. 162, yuanus, p. 162, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, 1894; scudaënsis, p. 98, blakistonius, p. 98, dolichorhinus, p. 100, aplodonticus, p. 100, schizodonticus, p. 100, orthopodicus, p. 100, mitratus, p. 102, ellipticus, p. 103, elegans, p. 103, minoënsis, p. 104, rutilus, p. 195, yesoënsis, p. 105, *Heude*, *op. cit.* vol. iii, 1896.

Sikaïllus sika, infelix, daimius, rex, paschalis, regulus, aceros, sicarius, dejardinius, consobrinus, marmandianus, latidens, brachypus, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. iv, pp. 98–111, pls. xiv–xix and xxii, 1898.

Cervus (Pseudaxis) sica, *Ward*, *Records of Big Game*, ed. 6, p. 149, 1910.

Cervus (Pseudaxis) sika, *Pocock*, *Proc. Zool. Soc.* 1910, p. 942.
Cervus (Sika) nippon, *Lydekker*, *Ward's Records of Big Game*, ed. 7, p. viii, 1914.

Shika or Sika: Japanese Deer.

Typical locality Japan.

The type species; also type of *Sikaïllus*, the other forms of which are from the Goto Islands, Japan.

Size typically small, shoulder-height about 33 inches, but larger in the race inhabiting the Chinese mainland; general colour bright rufous chestnut, spotted on the body with white in summer; uniformly coloured, or nearly so, in winter, when it is dark umber-brown, with the hairs annulated; a light chestnut patch on the shoulder; sides of upper and whole of lower lip white; tail mainly white, frequently with a narrow black line on the upper surface and sometimes a dark terminal tuft; metatarsal tuft large and white; insides and part of base of outer surface of ears covered with white hairs.

The range includes Japan, Northern China, and Manchuria. Whether all the forms named by Heude under the headings of *Cervus* and *Sikaïllus* are identical with the present species is doubtful; the so-called *C. dorilliauus*, for instance, may be Formosan.

A. Size smaller ..... *C. n. nippon.*
B. Size larger ..... *C. n. mantchuricus.*

## A.—Cervus nippon nippon.

Cervus sica typicus, *Lydekker*, *Proc. Zool. Soc.* 1897, p. 39, *Deer of All Lands*, p. 112, 1898, *Great and Small Game of Europe*, etc. p. 231, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 50, 1910.
Cervus nippon typicus. *Lydekker*, *Ward's Records of Big Game*, ed. 7, p. viii, 1914.

Typical locality Japan.

Size small, the height at the shoulder ranging from about 32 inches to 34 inches; white area of caudal region large, extending on to the sides of the buttocks, and completely bordered with black above and at the sides. Fine antlers measure from 21 to 26½ inches along the curve, with a basal girth of from 3½ to 5, and a tip-to-tip interval of from 12 to 20¼ inches.

The range, on the assumption that *C. eupis* is absolutely identical with the Japanese form, includes a part of China.

60. 12. 12. 1. Shed antlers. Japan.
*Purchased (Zoological Society)*, 1860.

63. 5. 28. 1. Shed antlers. Japan.
*Purchased (Zoological Society)*, 1860.

64. 12. 30. 3. Skin, formerly mounted. Kanegawa, Japan; from a stag presented to the Zoological Society by J. Wilks, Esq. Type of *Rusa japonica*.
*Purchased (Zoological Society)*, 1864.

83. 4. 14. 2. Skin, formerly mounted, and skeleton. Newchwang, Northern China. Type of *C. eupis*.
*Purchased (Zoological Society)*, 1883.

85. 2. 23. 1. Skull and antlers. Northern Japan; collected by H. Pryer, Esq. *Purchased*, 1885.

85. 2. 23. 2. Skull and antlers, immature. Same locality and collector. *Same history.*

92. 12. 2. 3–4. Two frontlets, with antlers. Kobe, Japan. *Presented by Dr. P. Rendall*, 1892.

93. 4. 17. 1–4. Four frontlets, with antlers. From stags bred at Powerscourt, County Wicklow, Ireland.
*Presented by Viscount Powerscourt*, 1893.

95. 5. 25. 1. Skull and antlers of hybrid between *C. nippon* and *C. elaphus*. Bred at Powerscourt.
*Same donor*, 1895.

95. 5. 25. 2. Antlers of a similar hybrid. Same locality.
*Same history.*

98. 3. 10. 1. Skin, mounted. From a stag bred in England. *Presented by the Hon. R. Ward*, 1898.

5. 5. 30. 29. Skull and skin, female. Nara Ken, Hondo, Japan; collected by M. P. Anderson, Esq.
*Presented by the Duke of Bedford, K.G.*, 1905.

5. 11. 3. 44. Skull, with antlers, and skin. Yakushima Island, Southern Japan; collected by Alan Owston, Esq.
*Same history.*

5. 11. 3. 45–46. Two skulls and skins, female. Same locality. *Same history.*

5. 11. 3. 47. Skin, young. Same locality. *Same history.*

5. 11. 3. 48. Skull and skin, young. Same locality.
*Same history.*

The following specimen may represent a distinct local race:—

7. 2. 13. 1. Skin, mounted. Liu-Kiu Islands.
*Presented by the Duke of Bedford, K.G.*, 1907.

## B.—Cervus nippon mantchuricus.

Cervus mantchuricus, *Swinhoe*, *Proc. Zool. Soc.* 1864, p. 169, 1865, p. 1; *Sclater*, *Trans. Zool. Soc.* vol. vii, p. 344, pls. xxxi and xxxii, 1871; *Brooke*, *Proc. Zool. Soc.* 1878, p. 908; *Moellendorff*, *Zool. Jahrb.* vol. ii, p. 588, 1887; *Lydekker*, *Horns and Hoofs*, p. 287, 1893; *Ward*, *Records of Big Game*, ed. 2, p. 21, 1896.

Pseudaxis mantchurica, *Gray*, *Cat. Ruminants Brit. Mus.* p. 72, 1872, *Hand-List Ruminants Brit. Mus.* p. 141, 1873.

Elaphoceros mantchuricus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lix, pt. 1, p. 93, 1874.

Axis mantschuricus, *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 93, 1881.

Cervus sica manchuricus, *Lydekker*, *Proc. Zool. Soc.* 1897, p. 39, *Deer of All Lands*, p. 112, pl. vii, 1898, *Great and Small Game of Europe*, *etc.* p. 232, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 50, 1910.

Cervus nippon manchuricus, *Lydekker*, *Ward's Records of Big Game*, ed. 7, p. viii, 1914.

Typical locality Manchuria; the type was obtained at Ying-tzu-kou (Nuchwang), the treaty-port.

Larger than the last, the height at the shoulder reaching 39 inches; the white area in the region of the tail much smaller, so as scarcely to be apparent in a side-view, but completely bordered with black; and spots and a tinge of red frequently retained on the hind-quarters of females in winter. No antlers exceeding in size the largest of the typical race have been recorded.

99. 6. 1. 1. Skin, immature, in summer coat, mounted. Northern China.
*Presented by the Duke of Bedford, K.G.*, 1899.

## XIII. CERVUS (SIKA) TAIOUANUS.

Cervus taiouanus, *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xxix, p. 90, 1860; *Sclater*, *Proc. Zool. Soc.* 1860, p. 376; *Aoki*, *Annot. Zool. Japon.* vol. viii, p. 342, 1913.

Cervus taëvanus, *Sclater*, *Proc. Zool. Soc.* 1862, p. 152, *Trans. Zool. Soc.* vol. vii. p. 345, 1871; *Swinhoe*, *Proc. Zool. Soc.* 1862, p. 362; *Brooke*, *ibid.* 1878, p. 909; *W. L. Sclater*, *Cat. Mamm. Ind.*

*Mus.* pt. ii, p. 45, 1891; *Lydekker, Horns and Hoofs*, p. 288, 1893, *Proc. Zool. Soc.* 1897, p. 45, *Deer of All Lands*, p. 116, pl. viii, 1898; *Ward, Records of Big Game*, ed. 2, p. 22, 1896; *Bentham, Asiat. Horns and Antlers Ind. Mus.* p. 70, 1908.

Pseudaxis taivanus, *Gray, Cat. Ruminants Brit. Mus.* p. 70, 1872, *Hand-List Ruminants Brit. Mus.* p. 141, 1873.

Elaphoceros taëvanus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 599, 1874.

Axis taivanus, *Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 93, 1881.

Cervus taioranus, *Heude, Bull. Soc. Philom.* ser. 7, vol. vi, p. 184, errorim.

Cervus (Pseudaxis) taëvanus, *Ward, Records of Big Game*, ed. 6, p. 51, 1910.

Cervus (Sika) taëvanus, *Lydekker, Ward's Records of Big Game*, ed. 7, p. viii, 1914.

Kwaroku: Formosan Sika.

Typical, and only, locality Formosa.

Type of *Pseudaxis* and *Elaphoceros*.

Type in Indian Museum, Calcutta.

Nearly allied to the typical species, but distinctly spotted in winter; size medium, shoulder-height about 35 inches; face shorter, muzzle more pointed, limbs shorter, and body longer than in Japanese sika; general colour in summer light chestnut, with large white spots, and a deep red tinge on the hind part of the neck; in winter the spots less numerous; the black border to the white caudal area forming a more distinct bar superiorly, and the median black line on the tail broader than in the type species, and the dark line down the back more strongly marked. The metatarsal gland does not appear to be white.

The largest recorded pair of antlers measure $19\frac{3}{4}$ inches along the curve, with a basal girth of $3\frac{3}{8}$, and a tip-to-tip interval of 13 inches.

The retention of spots in the winter coat in this southern species is noteworthy.

63. 5. 28. 2. Pair of shed antlers. Formosa. *Purchased* (*Zoological Society*), 1863.

65. 1. 30. 1. Shed antlers, menagerie specimen. Formosa. *Presented by Dr. P. L. Sclater*, 1865.

65. 12. 8. 22. Skin, mounted, and skeleton. Formosa. *Purchased* (*Zoological Society*), 1865.

68. 3. 21. 3. Skin, young, mounted. Probably bred in London. *Purchased* (*Zoological Society*), 1865.

68. 3. 21. 4. Skin, female, mounted. Formosa. *Same history.*

68. 12. 29. 14. Skin, mounted. Formosa. *Same history.*

## XIV. CERVUS (SIKA) HORTULORUM.

Cervus pseudaxis, *Gray*, *Proc. Zool. Soc.* 1861, p. 236, pl. xxvii, nec *Eydoux* and *Souleyet*, 1841-52.

Cervus hortulorum, *Swinhoe*, *Proc. Zool. Soc.* 1864, p. 169; *Lydekker*, *ibid.* 1897, p. 42, *Deer of All Lands*, p. 117, pl. ix, 1898, *Great and Small Game of Europe*, *etc.* p. 234, 1901.

(?) Cervus mandarinus, *Milne-Edwards*, *Rech. Mamm.* p. 174, 1871; *Brooke*, *Proc. Zool. Soc.* 1878, p. 968; *Lydekker*, *ibid.* 1897, p. 44, *Deer of All Lands*, p. 121, 1898.

Cervus dybowskii, *Taczanowski*, *Proc. Zool. Soc.* 1876, p. 123, *Brooke*, *ibid.* 1878, p. 909; *Noack*, *Humboldt*, vol. viii, p. 4, fig. 1, 1889; *Kohler*, *Zool. Garten*, vol. xliii, p. 28, 1892; *Lydekker*, *Horns and Hoofs*, p. 287, 1893, *Proc. Zool. Soc.* 1897, p. 40.

(?) Cervus mantschuricus major, *Noack*, *Humboldt*, vol. viii, p. 5, fig. 4, 1889.

Cervus dybowski, *Ward*, *Records of Big Game*, ed. 2, p. 22, 1896.

Cervus (Pseudaxis) hortulorum, *Ward*, *Records of Big Game*, ed. 6, p. 52, 1910.

Cervus (Sika) hortulorum, *Lydekker*, *Ward's Records of Big Game*, ed. 7, p. viii, 1914.

The type specimens were shot in the gardens of the Summer Palace, Pekin, after its sack on October 12th, 1860; the typical locality of *dybowskii* is the Usuri district of Manchuria.

Size large, the shoulder-height reaching 3 feet 7 inches: coat profusely spotted with white at all seasons, although somewhat more fully in summer than in winter, when it is very long and shaggy; in winter general colour of body in sub-adult males bright chestnut-brown; neck without spots, bluish grey at base, then a blackish collar, followed by chestnut; face bluish grey; metatarsal tuft similar to the hair of rest of shanks in summer, but the centre greyish white; thighs and fore-legs greyish brown; under-parts greyish white; tail rather short, white with a black median stripe, and often a dark band above the white on the buttocks; in summer the spots more numerous and the general colour chocolate-brown. Adult bucks (of the so-called *dybowskii*) in winter-coat are described by Noack as follows:—General colour yellowish umber-brown, tending

more to yellow in front and to umber behind, and becoming darker on the back; head as far as the nose yellowish brown, forehead and neck reddish brown, nose greyish red, upper lip yellowish red, a moderately large dark spot on the greyish white lower lip; ears thickly haired, dirty grey

Fig. 21.—Head of Dybowski's Deer (*Cervus* [*Sika*] *hortulorum*).
From a photograph by the Duchess of Bedford.

internally, rusty red externally; mane on head and neck long, shaggy, and whitish grey in colour; chest nearly black; under-parts whitish grey; the white caudal patch bordered in front with black; tail white with a black tip; front-shanks yellowish red, hind-shanks umber-brown, each with a dark streak in front; metatarsal tuft not light-coloured. Fine antlers (fig. 21) measure from 27 to 34¼ inches

along the curve, with a basal girth of from $4\frac{1}{8}$ to $5\frac{3}{4}$, and a tip-to-tip interval of from $18\frac{1}{2}$ to $34\frac{1}{2}$ inches. The type specimen of the so-called *C. mandarinus*, from N. China, preserved in the Museum at Paris, was described as very large, with the coat spotted at all seasons, and very long and shaggy in winter; colour darker than in the typical *hortulorum*, and spots less abundant in the winter, when the neck and limbs are similar in tint to the ground-colour of the body; under-parts dark; metatarsal tuft apparently similar in colour to the rest of the leg; tail comparatively long, mainly reddish, with little white. These alleged points of difference need not apparently be of more than seasonal or individual value; the type specimen having perhaps been killed before the winter coat was fully developed.

The two races appear to be distinguished as follows:—

A. Dark dorsal stripe not fully developed; spots more distinct on neck ..... *C. h. hortulorum.*

B. Dark dorsal stripe fully developed; spots less distinct on neck ..... *C. h. kopschi.*

## A.—Cervus hortulorum hortulorum.

Cervus hortulorum typicus, *Ward, Records of Big Game*, ed. 6, p. 52, 1910, ed. 7, p. 52, 1914.

The true home of this race is the Usuri district of Manchuria.

General characters those of the species, with the dark dorsal stripe imperfectly developed, and the spotting on the neck very distinct.

61. 6. 2. 1. Skin, mounted, immature. From an animal killed in the gardens of the Summer Palace, Pekin, October, 1860; collected by R. Swinhoe, Esq. Type; figured by Gray as *C. pseudaxis*.

*Presented by the Zoological Society*, 1861.

61. 6. 2. 2. Skin, mounted, and skull, immature female. Obtained at the same time and place as the preceding specimen. *Same history.*

61. 6. 2. 3. Skull, with antlers, and skin, immature. From the Summer Palace. *Same history.*

78. 5. 22. 1. Skin, mounted. South Usuri district, Manchuria; collected by Monsieur Taczanowski. Co-type of *Cervus dybowskii*. *Purchased*, 1878.

83. 8. 1. 1–2. Two skulls, female, one immature. Observatory Island, Korea.

*Presented by Capt. A. Carpenter, R.N.*, 1883.

97. 12. 12. 1. Skin, female, in summer coat, mounted. Manchuria. *Presented by the Duke of Bedford, K.G.*, 1897.

99. 8. 36. 4. Frontlet and antlers. Sutschan Valley, 280 miles east of Vladivostock, north of Manchuria.

*Same donor*, 1899.

2. 10. 2. 2. Skin, in summer coat, mounted. Same locality. *Same donor*, 1902.

## B.—Cervus hortulorum kopschi.

Cervus kopschi, *Swinhoe*, *Proc. Zool. Soc.* 1873, p. 574; *Brooke*, *ibid.* 1878, p. 909; *Heude*, *Bull. Soc. Philom.* ser. 7, vol. vi, p. 184, 1882.

Cervus hortulorum kopschi, *Lydekker*, *Great and Small Game of Europe, etc.* p. 239, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 52, 1914, ed. 7, p. 52, 1914.

Typical locality Kien-chang, Kiang-si, south-western China.

Dorsal stripe more fully developed, and spots less distinct on upper part of neck, and not extending so far over shoulder and thighs as in typical race.

73. 6. 27. 1. Skin, immature, in winter coat, mounted, and skull. Kien-chang, Kiang-si, near the border of Fo-kien, south-western China; collected by R. Swinhoe, Esq. Type. *Purchased*, 1873.

1. 3. 2. 18. Skin, with antlers, and leg-bones. Yang-tsi Valley. Noticed by present writer, *op. cit.*, 1901.

*Presented by F. W. Styan, Esq.*, 1901.

1. 3. 2. 19. Skin, female, in winter coat. Chin-teh, An-hwei, Yang-tsi Valley. *Same history.*

1. 3. 2. 20. Body-skin, in summer coat. Same locality. *Same history.*

10. 5. 26. 1. Skin, female. Tai-Kung-Shan, An-hwei. *Presented by Commander the Hon. R. O. V. Bridgeman*, 1910.

### Incertæ Sedis.

Cervus pseudaxis, *Eydoux and Souleyet, Voyage de "La Bonite," Zoology*, vol. i, p. 64, 1841–52; *Brooke, Proc. Zool. Soc.* 1878, p. 909; *Lydekker, ibid.* 1897, p. 38, *Deer of All Lands*, p. 1, 1898.

Axis pseudaxis, *Gray, Cat. Ungulata Brit. Mus.* p. 214, 1852; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 274, 1874.

Sikelaphus pseudaxis, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 146, 1894.

"The animal which has been figured under the name of *Cervus pseudaxis*," wrote Gray in 1852, "was obtained by MM. Eydoux and Souleyet in Java, but they did not believe that it was a native of that country. It lived several years in the Jardin des Plantes at Paris, and hence a series of its horns was procured and figured; and while there it bred with the common axis, and the mule produce was fertile. Some naturalists have given the Sooloo [Sulu] Islands, near the Philippines, as the habitat of this specimen, but I do not know on what authority." Brooke observed that he hesitated to identify it with "any species of the subgenus. The type specimen is still preserved in the Muséum d'Histoire Naturelle at Paris; but though I have often carefully examined it, the absence of the skull, and the great uncertainty of the locality where it was procured, render it impossible to form a decided opinion." Sclater suggested that it is really the same as *C. taiouanus*, in which case that name would have to be superseded, *pseudaxis* being the earliest of all.

## 6. Subgenus **CERVUS.**

Elaphus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 307, 1827.

Harana, *Hodgson, Ann. Nat. Hist.* vol. i, p. 154, 1838.

Pseudocervus, *Hodgson, Journ. Asiat. Soc. Bengal*, vol. x, p. 904, 1841.

Strongyloceros, *Owen, Brit. Foss. Mamm. and Birds*, p. 472, 1846.

Eucervus, *Aclogue, Faune Franç, Mamm.* p. 71, 1899; nec *Gray.*

Antlers usually with at least five tines inclusive of a bez (second), which may, however, be absent, and the brow-tine forming an obtuse angle with the beam; bare portion of muzzle (muffle) extending but slightly below nostrils; hind-pasterns as in *Rusa;* metatarsal gland hairy; tail short;

general colour uniform, typically with a large light rump-patch; young spotted.

The distributional area includes Europe, North Africa, Asia north of the outer range of the Himalaya, and North America.

The following is a "key" to the species:—

A. Muzzle dark; hair of withers not reversed.
  *a*. Light area of buttocks yellow, at least in region of tail.
    *a'*. Antlers with more than 5 tines, of which the terminal ones are arranged irregularly and often cupped; tail longer; under-parts not conspicuously darker than back ..... *C. elaphus.*
    *b'*. Antlers generally with more than 5 tines, of which the 4th is the largest, and, with those above it, placed in a plane parallel to axis of head; tail shorter; under-parts conspicuously darker than back..... *C. canadensis.*
    *c'*. Antlers usually 5-tined, with the 4th tine small and the two terminal ones forming a fork placed transversely to long axis of face; tail medium..... ..... *C. yarkandensis.*
  *b*. Light area of buttocks white; tail very short.
    *a'*. Muzzle mainly dark, lower lip and chin fawn or brown; ears long and pointed, with sinuous upper margins.
      *a''*. A larger or smaller white rump-patch; antlers (5-tined) sharply angulated and bent forwards at 3rd tine, in such a manner that tips of the 5th are inclined inwards..... *C. wallichi.*
      *b''*. White area restricted to hind aspect of hams; a brownish patch on croup in advance of tail; antlers wapiti-like..... *C. macneilli.*
    *b'*. Muzzle pale fawn, lower lip and chin white; ears bluntly pointed, with straight upper margins; antlers approximating to those of *C. wallichi*, but less bent forwards; white area of buttocks much as in *C. macneilli*..... *C. cashmiriensis.*
B. Muzzle white; hair of withers reversed ..... *C. albirostris.*

## XV. CERVUS ELAPHUS.

Cervus elaphus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 66, 1758, ed. 12, vol. i, p. 93, 1766; *Kerr, Linn.'s Anim. Kingdom*, p. 298, 1793; *F. Cuvier, Hist. Nat. Mamm.* vol. i, pls. 93 and 94, 1820; *Cuvier, Ossemens Fossiles*, ed. 2, vol. iv, p. 24, 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. iv, p. 90, 1827; *Jenyns*,

*Brit. Vest. Anim.* p. 37, 1835; *Bell, Brit. Quadrupeds*, p. 394, 1837, ed. 2, p. 348, 1874; *Keyserling and Blasius, Wirbelth. Europ.* vol. iv, p. 26, 1840; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 170, 1842; *Owen, Rep. Brit. Assoc.* 1843, p. 236, 1844; *Gray, List Mamm. Brit. Mus.* p. 177, 1843, *List Osteol. Brit. Mus.* p. 64, 1847, *Proc. Zool. Soc.* 1850, p. 227, *Cat. Ungulata Brit. Mus.* p. 195, 1852, *Cat. Ruminants Brit. Mus.* p. 68, 1872, *Hand-List Ruminants Brit. Mus.* p. 139, 1873; *Blasius, Fauna Deutschl.* vol. i, p. 439, 1857; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 257, 1862; *Sclater, Trans. Zool. Soc.* vol. vii, p. 342, 1871; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. i, p. 565, 1874; *Danford and Alston, Proc. Zool. Soc.* 1877, p. 276, 1880, p. 54; *Brooke, ibid.* 1878, p. 911; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 293, 1884; *Lydekker, Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 94, 1885, *Proc. Zool. Soc.* 1890, p. 363, *Horns and Hoofs*, p. 271, 1893, *British Mammals*, p. 240, 1896, *Deer of All Lands*, p. 64, 1898, *Great and Small Game of Europe, etc.* p. 209, 1901; *Woodward and Sherborn, Cat. Brit. Foss. Vert.* p. 330, 1890; *Nehring, Tundren und Steppen*, p. 110, 1910; *Flower and Lydekker, Study of Mammals*, p. 322, 1891; *Satunin, Zool. Jahrb., Syst.* vol. ix, p. 309, 1896; *Büchner, Ann. Mus. Zool. St. Pétersb.* 1896, p. 387; *Millais, Mamm. Gt. Britain*, vol. iii, p. 91, 1906; *Nitsche, Studien über Hirsche*, pl. i, 1898; *Lönnberg, Arkiv Zool.* vol. iii, no. 9, p. 9, 1906; *Winge, Danmarks Fauna, Pattedyr*, p. 171, 1908; *Trouessart, Faune Mamm. Europe*, p. 228, 1910; *Ward, Records of Big Game*, ed. 6, p. 1910, ed. 7, p. 1, 1914; *Miller, Cat. Mamm. West. Europe*, p. 968, 1912; *Joleaud, Rev. Africaine*, no. 287, p. 1, 1913; *Loder, Proc. Zool. Soc.* 1914, p. 488.

Cervus (Elaphus) elaphus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 307, 1827.

Cervus (Strongyloceros) elaphus, *Owen, Brit. Foss. Mamm. and Birds*, p. 472, 1846.

Eucervus elaphus, *Aclogue, Faune Franç*e, p. 71, 1899.

Cervus vulgaris, *Botezat, Morphol. Jahrb.* vol. xxiii, p. 115, 1903.

Cervus (Cervus) elaphus, *Pocock, Proc. Zool. Soc.* 1910, p. 941.

Red Deer.

The typical species.

Typical locality southern Sweden; the range includes the greater part of Europe (but not the Italian peninsula), and extends at least as far east as the Caucasus and the Caspian provinces of Persia.

Size typically large, the shoulder-height reaching 4 or 4½ feet. Antlers rounded, and, when fully developed with a bez-tine and a total of more than five points, of which the terminal ones may form a cup, the fourth tine not specially large nor situated in the same fore-and-aft plane as those above; ear longer than half the length of head; tail moder-

ately short and pointed, and light rump-patch of moderate dimensions; general colour reddish brown in summer, greyish brown in winter, typically with the under-parts lighter than back (which may have a blackish spinal stripe), and never strongly contrasted with the upper-parts; mane not

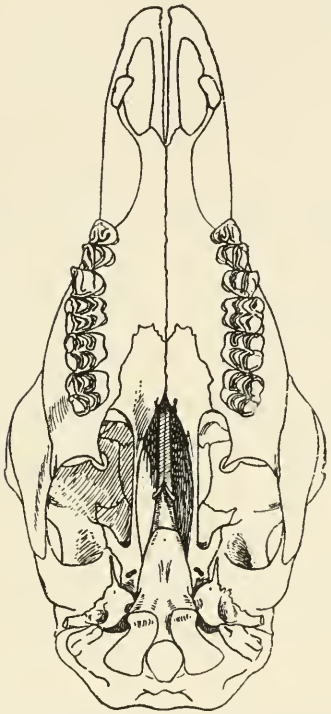

Fig. 22.—Palatal Aspect of Skull of Red Deer (*Cervus elaphus*). ⅓ nat. size.
From Miller, *Cat. Mamm. Western Europe.*

darker than rest of coat; no conspicuous whitish markings, except occasionally the rump-patch.

The following is a tentative "key" to the races:—

A. Size small or medium, under-parts lighter.
  *a*. Size small, bez-tine usually wanting.
    *a'*. Size smaller, colour darker ..... *C. e. corsicanus.*
    *b'*. Size larger, colour lighter ..... *C. e. barbarus.*
    *c'*. Size smaller, colour greyer, skull narrower *C. e. hispanicus.*

*b*. Size larger, bez-tine usually present.
*b'*. Size larger, colour redder, skull wider.
*b''*. Rump-patch not markedly lighter than flanks or black-bordered in front ..... *C. e. elaphus.*
*c''*. Rump-patch markedly lighter than flanks, usually black-bordered in front .. *C. e. hippelaphus.*
*c'*. Size smaller, rump-patch black-bordered in front.
*c''*. Colour paler and greyer ..... *C. e. atlanticus.*
*d''*. Colour darker and less grey ..... *C. e. scoticus.*
B. Size large, under-parts darker ..... *C. e. maral.*

## A.—Cervus elaphus barbarus.

Cervus barbarus, *Bennett, List Anim. Gardens Zool. Soc.* p. 31, 1837; *Gray, Proc. Zool. Soc.* 1850, p. 227, *Cat. Ungulata Brit. Mus.* p. 197, 1852, *Cat. Ruminants Brit. Mus.* p. 68, 1872, *Hand-List Ruminants Brit. Mus.* p. 140, 1873; *Gervais, Hist. Nat. Mamm.* vol. ii, p. 261, 1855; *Sclater, Trans. Zool. Soc.* vol. vii, p. 344, 1871; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 577, 1874; *Jolcaud, Rev. Africaine*, no. 287, p. 5, 1913.

Cervus corsiniacus, *Gervais, Ann. Sci. Nat., Zool.* ser. 3, vol. x, p. 206, 1848.

Cervus elaphus, *Loche, Cat. Mamm. Algérie*, p. 26, 1858, *Rev. Marit. et Coloniale*, 1860, p. 151, *Explor. Sci. Algérie, Mamm.* p. 34, 1887; *Blanchard, Tunisie au XX^me^ Siècle, Zool.* p. 136, 1904.

Cervus corsicanus, *Lataste, Actes Soc. Linn. Bordeaux*, vol. xxxix, p. 286, 1885; nec *Erxleben.*

Cervus elaphus barbarus, *Lataste, Explor. Sci. Tunisie, Mamm.* p. 34, 1887; *Lydekker, Deer of All Lands*, p. 65, 1898, *Game Animals of Africa*, p. 385, 1908; *Drewitt, Proc. Zool. Soc.* 1904, vol. ii, p. 130; *Trouessart, Caus. Sci. Soc. Zool. France*, vol. i, p. 405, 1905; *Ward, Records of Big Game*, ed. 6, p. 31, 1910, ed. 7, p. 31, 1914.

Typical locality North Africa; now found in certain parts of Algeria, Tunisia, and Senegambia, but apparently very scarce.

Size considerably smaller than in typical race; bez-tine of antlers at least generally wanting; general colour dark brown, with a greyish brown dorsal stripe and irregular whitish spots on flanks and in some cases on back; rump-patch much lighter than back, without dark anterior border, and including tail. Maximum antler-length $38\frac{7}{8}$ inches.

53. 3. 7. 37. Skeleton, female. North Africa.
*Purchased* (*Zoological Society*), 1853.

63. 5. 13. 3–5. Three shed antlers. Tunisia.
*Purchased* (*Zoological Society*), 1863.

99. 10. 13. 1. Head, mounted. North Africa.
*Presented by the Duke of Bedford, K.G.*, 1899.

0. 12. 13. 1. Skin, mounted, in winter coat. North Africa. *Same donor*, 1900.

## B.—Cervus elaphus corsicanus.

Cervus corsicanus, *Erxleben, Syst. Regn. Anim.* vol. i, p. 307, 1777; *Joleaud, Rev. Africaine*, no. 287, p. 5, 1913.

Cervus elaphus corsicanus, *Kerr, Linn.'s Anim. Kingdom*, p. 299, 1793; *Lydekker, Deer of All Lands*, p. 74, 1898; *Trouessart, Faune Mamm. Europe*, p. 229, 1910; *Miller, Cat. Mamm. West. Europe*, p. 969, 1912.

Cervus mediterraneus, *Blainville, Journ. Phys.* vol. xciv, p. 262, 1822.

Cervus elaphus minor, *Wagner, Schreber's Säugthiere, Suppl.* vol. v, p. 354, 1855; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 575, 1874.

Typical locality Corsica, but also found in Sardinia.

Closely allied to the last, with which it apparently agrees in the general absence of the bez-tine of the antlers, but smaller, the size being approximately the same as in the next race, but general colour darker than in that or any other of the smaller continental forms, the general colour being dark brown in summer and blackish in winter.

No specimen in collection.

## C.—Cervus elaphus hispanicus.

Cervus elaphus hispanicus, *Hilzheimer, Archiv für Rassen- und Gesellschafts-Biologie*, 1909, p. 313; *Miller, Cat. Mamm. West. Europe*, p. 969, 1912.

(?) Cervus elaphus bolivari, *Cabrera, Bol. Soc. Españ. Hist. Nat.* vol. xi, p. 559, 1911, *Cat. Met. Mam. Mus. Madrid*, p. 129, 1912.

Typical locality Spain, probably the south-western districts.

Type in Stuttgart Museum; type of *bolivari*, which is from El Pardo, Madrid, in Madrid Museum.

Apparently smaller than in the under-mentioned Scots race, with the colour more decidedly greyish, and the skull narrower, more especially in the interorbital region and the palate.* *C. e. bolivari* is stated to be a larger form from

* For cranial measurements of this and other races see Miller, *op. cit.* p. 982.

central and northern Spain, but its right to recognition is more than doubtful.

95. 9. 4. 14. Skull, with antlers, and skin. Coto Donaña, Huelva, Spain; collected by A. Ruiz.

*Presented by the Lord Lilford*, 1895.

95. 9. 4. 15. Skull and skin, female. Same locality and collector. *Same history.*

8. 3. 8. 14. Skull, with antlers, and skin. Same locality.

*Presented by Abel Chapman, Esq.*, 1908.

8. 3. 8. 15. Skull, with antlers. Same locality.

*Same history.*

## D.—Cervus elaphus elaphus.

Cervus elaphus typicus, *Lydekker*, *Deer of All Lands*, p. 65, 1898; *Joleaud*, *Rev. Africaine*, no. 287, p. 1, 1912, partim.

Cervus elaphus elaphus, *Miller*, *Cat. Mamm. West. Europe*, p. 967, 1912.

Typical locality southern Sweden.

Size large; rump-patch not markedly lighter than flanks, and without well-defined black border.

According to Lönnberg, the range seems to have extended originally over the greater part of Götaland, but at the present day red deer in Sweden are confined to southern Skania, where they are chiefly found on a few large estates, Häckeberga, Öfvedskloster, Börringe, Söfdeborg, Snogeholm, Skabersjö, etc. Their number is small, perhaps not more than about 100 head.

No specimen in collection.

## E.—Cervus elaphus atlanticus.

Cervus elaphus atlanticus, *Lönnberg*, *Arkiv Zool.* vol. iii, no. 9, p. 9, 1906; *Collett*, *Bergens Mus. Aarbog*, 1909, no. 6; *Trouessart*, *Faune Mamm. Europe*, p. 228, 1910; *Miller*, *Cat. Mamm. West. Europe*, p. 967, 1912.

Typical locality Hitteren Island, Trondhjem, Norway; the range including the west coast of Norway from Stavanger Fjord north to about latitude 65°.

Size smaller and colour paler than in typical race, with a distinct blackish band on front border of rump-patch.

No specimen in collection.

## F.—Cervus elaphus scoticus.

Cervus elaphus scoticus, *Lönnberg*, *Arkiv Zool.* vol. iii, no. 9, p. 11, 1906; *Trouessart*, *Faune Mamm. Europe*, p. 228, 1910; *Miller*, *Cat. Mamm. West. Europe*, p. 968, 1912.

Typical locality Glenquoich Forest, Inverness; the wild red deer of the west of England and Ireland are provisionally included in this race.

Closely allied to the Norwegian race, but darker and less grey. According to Miller, the cranial characters given by Lönnberg as distinctive are inconstant.

689, *b*. Frontlet and antlers. England. *No history.*

46. 11. 20. 17. Frontlet and antlers. England.
*Purchased* (*Leadbeater*), 1846.

47. 12. 11. 16. Skull, with antlers. England.
*Purchased* (*Baker*), 1847.

49. 3. 5. 1. Frontlet and antlers. From a peat-bog, at a depth of about 20 feet, at Diglis, near Worcester, 1844. One of the specimens referred to on page 475 of Owen's *British Fossil Mammals and Birds.*
*Presented by Jabez Allies, Esq.*, 1849.

50. 11. 22. 67. Skeleton. Probably British.
*Purchased* (*Zoological Society*), 1850.

63. 11. 16. 5. Skin, mounted. Alnwick Chase, Northumberland.
*Presented by the Duke of Northumberland, K.G.*, 1863.

86. 6. 10. 1. Skull, without antlers. Loch Sunart, Argyll. *Presented by Gen. Hamilton*, 1886.

96. 12. 21. 1–5. Three skulls and two pairs of antlers. Isle of Jura. *Presented by H. Evans, Esq.*, 1896.

97. 4. 3. 3. Skin, mounted. Woburn Park, Beds.
*Presented by the Duke of Bedford, K.G.*, 1897.

6. 2. 26. 1. Skull, female. Exmoor, Devonshire.
*Presented by R. A. Saunders, Esq.*, 1906.

8. 2. 10. 1. Skull and skin, female. Fort William.
*Presented by W. Jones, Esq.*, 1908.

9. 1. 15. 1. Skull, with antlers, and skin. Balmacaan, Inverness. *Presented by Bradley Martin, Esq.*, 1909.

9. 1. 15. 2. Skull and skin, female. Same locality.
*Same history.*

11. 2. 21. 1–2. Two frontlets and antlers. Jura, Ardgour, Argyllshire. *Presented by F. Hamilton-Leigh, Esq.*, 1911.

14. 2. 22. 1. Skull and antlers. Exmoor, Devon. *Presented by Morland Greig, Esq.*, 1914.

3. 11. 6. 1. Skin. New Zealand; introduced. *Presented by St. George Littledale, Esq.*, 1903.

## G.—Cervus elaphus hippelaphus.

Cervus claphus hippelaphus, *Kerr*, *Linn.'s Anim. Kingdom*, p. 298, 1792.

Cervus elaphus germanicus,* *Desmarest*, *Mammalogie*, vol. ii, p. 434, 1822; *Lönnberg*, *Arkiv Zool.* vol. iii, no. 9, p. 14, 1906; *Trouessart*, *Faune Mamm. Europe*, p. 228, 1910; *Miller*, *Cat. Mamm. West. Europe*, p. 965, 1912.

Cervus claphus albus, *Desmarest*, *Mammalogie*, vol. ii, p. 435, 1822 (nomen nudum); *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 575, 1874.

Cervus claphus albifrons, *Reichenbach*, *Säugeth.* vol. iii, pl. iii, *a*, 1845.

Cervus claphus varius, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 574, 1874.

Including:

Cervus balticus,
Cervus albicus,
Cervus rhenanus,
Cervus bajovaricus,
} *Matschie*, *Weidwerk in Wort u. Bild*, vol. xvi, p. 187, 1907.

Cervus elaphus neglectus, *Matschie*, *Deutsche Jäger-Zeitung*, vol. lviii, p. 688, 1912 (Posen).

Cervus elaphus visurgensis
Cervus elaphus debilis
} *Matschie*, *op. cit.* p. 734, 1912 (Upper and Lower Rhineland).

Cervus elaphus saxonicus, *Matschie*, *op. cit.* p. 737, 1912 (Saxony).

Typical locality Germany, whence the range probably extends at least as far east as the western Carpathians.

Equal in size to typical race, but with the rump-patch distinctly lighter than flanks and usually bordered in front with a well-marked black or blackish band.

Of the above mentioned local forms named by Matschie, *Cervus balticus* has the beam of the antlers evenly and gradually concave on the inner border and the points of all the tines directed inwards. Typical locality Liebemühl, Ostpreussen. In *albicus* the beam is bent abruptly inwards

* It seems doubtful whether the "Cervus germanicus" of Kerr, *loc. cit.*, was intended for a species-name.

at the level of the trez-tine, the points of the inner tines are directed inwards, and those of the outer prongs upwards. Typical locality Muskau, Oberlausitz, Silesia. In *rhenanus* the beam is bent abruptly inwards at the level of the trez-tine, and the points of all tines are directed upwards. Typical locality Viernheim, Hessen-Darmstadt. In *bajovaricus* the antlers resemble those of *rhenanus*, but have the inner tines directed inwards and backwards. Typical locality Rohner, Königssee, Oberbayern.

689, *p.* Pair of antlers. Germany. *No history.*

43. 12. 29. 5. Skin, mounted, female. France. *Purchased* (*Lefebvre*), 1843.

43. 12. 29. 14. Skin, mounted, young. Same locality. *Same history.*

59. 9. 6. 103. Skull, female. Southern Germany; collected by Dr. A. Günther. *Purchased*, 1859.

83. 6. 12. 1. Frontlet, without antlers. Göhrde, Hanover (H.I.M. Kaiser Wilhelm I.). *Presented by J. E. Harting, Esq.*, 1888.

89. 11. 20. 1, 2. Two pairs of antlers. Bohemia. *Presented by Col. J. Evans*, 1889.

11. 9. 13. 16–18. Three frontlets and antlers. Bavaria. These should represent the so-called *C. c. bajovaricus*. *Presented by F. N. A. Fleischmann, Esq.*, 1911.

## H.—Cervus elaphus, subsp.

Cervus vulgaris campestris, *Botezat, Morphol. Jahrb.* vol. xxxii, p. 154, 1903; *nec* C. campestris, *F. Cuvier.*

"Carpathian Deer," *Lydekker*, *Field*, vol. cv, p. 326, 1905.

"Short-faced Carpathian Red Stag," *Leigh*, *Field*, vol. cv, p, 355, 1905.

Typical locality the Marmoros and Bukowina districts of the Hungarian and Galician Carpathians.

As represented by a stag living in the Duke of Bedford's Park at Woburn in 1905, this large red deer may be in some degree intermediate between *C. c. germanicus* and *C. c. maral*, being apparently redder than the latter, but with less black on the under-parts, although more than in the former. The hinds have been stated to show the short face of the western

races; but, according to Loder,* while in skulls of Scotch and German stags the proportion of the interorbital width to the length (from summit of occipital crest to tips of premaxillæ) is 1 to 3·3, in Carpathian† and Caucasian stags it is 1 to 3·6. The same writer adds that he could detect no difference between Carpathian and Caucasian skulls—a view which coincides with the experience of the present writer, although not with that of Miller.

96. 10. 10. 1. Frontlet and antlers. Galician Carpathians. *Presented by H.H. Prince Heinrich of Liechtenstein*, 1906.

## I.—Cervus elaphus maral.

Cervus maral, *Ogilby*, *Rep. Council Zool. Soc.* 1840, p. 22; *Selater*, *Trans. Zool. Soc.* vol. vii, p. 336, pl. xxix, 1871; *Gray*, *Cat. Ruminants Brit. Mus.* p. 69, 1872; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 597, 1874; *Blanford*, *Eastern Persia*, vol. ii, p. 95, 1876; *Brooke*, *Proc. Zool. Soc.* 1878, p. 812; *Radde*, *Säugeth. Talysch.* p. 10, 1886; *Satunin*, *Zool. Jahrb.*, *Syst.* vol. ix, p. 309, 1896; *Ward*, *Records of Big Game*, ed. 2, p. 30, 1876; *Trouessart*, *Faune Mamm. Europe*, p. 229, 1910.

Cervus caspius, *Radde*, *Säugeth. Talysch.* p. 10, 1886.

Cervus elaphus maral, *Lydekker*, *Deer of All Lands*, p. 75, 1898, *Great and Small Game of Europe*, *etc.* p. 217, 1901; *Satunin*, *Mitt. Kaukas. Mus.* vol. i, pp. 65 and 129, 1901, vol. ii, pp. 210 and 357, 1906, vol. iii, p. 49, 1907, vol. vii, p. 20, 1912; *Leigh*, *Field*, vol. cv, p. 355, 1905; *Ward*, *Records of Big Game*, ed. 6, p. 28, 1910, ed. 7, p. 28, 1914; *Miller*, *Cat. Mamm. West. Europe*, p. 967, 1912; *Loder*, *Proc. Zool. Soc.* 1914, p. 489.

(?) Cervus vulgaris montanus, *Botezat*, *Zool. Jahrb.*, *Syst.* vol. xxxii, p. 155, 1903.

Cervus (Cervus) maral, *Pocock*, *Proc. Zool. Soc.* 1910, p. 940.

Cervus caucasicus, *Winans*, *Amer. Mus. Journ.* vol. xiv, p. 67, 1914, nomen nudum.

Maral (Persian), Ollen (Russian).

"Polish Stag," *Lydekker*, *Field*, vol. cv, p. 326, 1905.

Typical locality the Caspian provinces of Persia.

Size larger and build heavier than in any other of the properly named local races, the shoulder-height reaching 4½ feet; the neck relatively thick, and the face, especially in females, longer and more pointed than in the western races, and the tail thicker. General colour in summer red,

* *Proc. Zool. Soc.* 1914, p. 488.

† As represented by stags from the Galician estate of the late Prince Heinrich from Liechtenstein.

frequently marked with yellow spots; in winter dark slaty grey, with the black-bordered rump-patch a deeper yellow than in the more typical races, and the shoulders, thighs, and under-parts nearly black. Antlers large and less complex than those of the latter, the number of tines seldom exceeding 8, and often only 6, although occasionally 10 or 12; the bez-tine, which may be wanting, frequently much shorter

Fig. 23.—Antlers of Eastern Red Deer, or Maral (*Cervus elaphus maral*).

than the brow-tine, which is long and much curved upwards, and the fourth tine generally more distinct from the crown; maximum antler-length 48½ inches.

Exclusive of the eastern Carpathians, to which this deer may be a recent immigrant, the range extends from the Caucasus through Galicia, the Caspian area, and the Crimea to northern Persia and Asia Minor, and may also include parts of Turkey and Greece. The so-called Polish stag of the Marmoros district of the Hungarian Carpathians is generally believed to be a dwarfed form of the maral which reached that area from Galicia; possibly the small dark stag from the Galician Carpathians, which has been named

*C. vulgaris montanus*, may be the same. It is noteworthy that a smaller form of red deer occurs with the maral in the Ak-Dagh, Asia Minor.* Caucasian maral hinds have rather shorter faces than those from farther east.

54. 4. 26. 6. Single antler. Lake Van, Armenia.
*Presented by Lord Arthur Hay*, 1854.

* * * *. Single antler. Crimea. Described and figured by the present writer, *Proc. Zool. Soc.* 1890, p. 363, pl. xxx, fig. 2. *No history.*

55. 12. 26. 159. Skull, female. Persia; collected by Sir J. McNeill. Co-type; figured in *Knowsley Menagerie*.
*Transferred from Zoological Society's Museum*, 1855.

58. 5. 14. 11. Antlers. Circassia; collected by the Lord Ducie. Figured by Sclater, *Trans. Zool. Soc.* vol. vii, pl. xxix. *Purchased* (*Zoological Society*), 1858.

85. 8. 4. 2. Frontlet and antlers. Trebizond, Asia Minor. *Presented by Consul A. Biliotti*, 1885.

87. 12. 22. 4. Frontlet and antlers. Psebai Valley, N.W. Caucasus, 7,000 feet.
*Presented by St. George Littledale, Esq.*, 1887.

89. 10. 6. 1. Single (right) antler. Jarpuz, Beinbighas Mountains, near Albistan, Asia Minor. Described and figured by the present writer, *Proc. Zool. Soc.* 1890, p. 363, pl. xxx, fig. 1. *Presented by C. G. Danford, Esq.*, 1889.

92. 3. 16. 3. Skeleton, with antlers. Western Caucasus.
*Presented by St. George Littledale, Esq.*, 1892.

92. 3. 16. 4. Skeleton, female. Same locality.
*Same history.*

2. 6. 2. 6. Skin. Western Caucasus.
*Presented by St. George Littledale, Esq.*, 1902.

10. 11. 11. 1. Skin, mounted, in early summer coat, with antlers, freshly clean from velvet, of another individual. Caucasus. Length of antlers along outer curve 44½ inches; basal girth 7 inches.
*Presented by the Duke of Bedford, K.G.*, 1910.

10. 11. 11. 2. Skull and antlers of the preceding specimen. *Same history.*

* Lydekker, *Field*, vol. cxx., p. 1122, 1912.

## XVI. CERVUS CANADENSIS.

Cervus elaphus canadensis, *Erxleben, Syst. Regn. Anim.* vol. i, p. 305. 1777; *Kerr, Linn.'s Anim. Kingdom*, p. 299, 1792.

Cervus canadensis, *Schreber, Säugthiere*, vol. v, pl. ccxlvi, *A*, 1783; *F. Cuvier, Hist. Nat. Mamm.* vol. i, pls. 95 and 96, 1820; *Desmarest, Mammalogie*, vol. ii, p. 433, 1822; *Cuvier, Ossemens Fossiles*, ed. 2, p. 27, 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 96, 1827; *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 156, pl. ix, 1835; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 171, 1842; *Gray, List Mamm. Brit. Mus.* p. 177, 1843, *Proc. Zool. Soc.* 1850, p. 226, *List Osteol. Brit. Mus.* p. 65, 1847, *Cat. Ungulata Brit. Mus.* p. 193, 1852, *Cat. Ruminants Brit. Mus.* p. 68, 1872, *Hand-List Ruminants Brit. Mus.* p. 257, 1873; *F. Cuvier, Hist. Nat. Mamm.* vol. iv, pls. 345 and 346, 1848; *Pucheran, Arch. Mus. Paris*, vol. vi, p. 386, 1852; *Baird, N. Amer. Mamm.* p. 638, 1857; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 257, 1862; *Sclater, Trans. Zool. Soc.* vol. vii, p. 342, 1872; *Caton, Antelope and Deer of N. America*, p. 77, 1877, ed. 2, p. 77, 1884; *Brooke, Proc. Zool. Soc.* 1878, p. 913; *Merriam, Mammals of Adirondacks*, p. 143, 1884; *True, Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1855; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 208, 1884; *Flower and Lydekker, Study of Mammals*, p. 322, 1891; *Merrick, Mamm. Minnesota*, p. 278, 1892; *Rhoads, Proc. Ac. Philadelphia*, 1897, p. 207; *Nitsche, Studien über Hirsche*, pl. vi, 1898; *Lydekker, Deer of All Lands*, p. 94, pl. vi, 1898, *Great and Small Game of Europe, etc.* p. 51, 1901; *Elliot, Synop. Mamm. N. America* (*Field Mus. Zool. Pub.* vol. ii), p. 34, 1901, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 43, 1907; *Stone and Cram, American Mammals*, p. 31, 1903; *Holding, Proc. Zool. Soc.* 1904, vol. i, p. 131; *Ward, Records of Big Game*, ed. 6, p. 39, 1910, ed. 7, 39, 1914; *Miller, List N. Amer. Mamm.* p. 384, 1912; *Cabrera, Cat. Met. Mam. Mus. Madrid*, p. 130, 1912.

Cervus wapiti, *Barton, Journ. Med. and Phys. Philadelphia*, vol. iii, p. 36, 1808; *Leach, Journ. Phys.* vol. lxxxv, p. 67, 1818.

Cervus major, *Ord, Guthrie's Geography*, p. 292, 1815.

Cervus (Elaphus) canadensis, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 308, 1827.

Cervus strongyloceros, *Richardson, Fauna Bor.-Amer., Mamm.* vol. i, p. 251, 1828; *Gray, Knowsley Menagerie*, pl. xxxvi, 1850.

Elaphus canadensis, *De Kay, Zool. New York*, vol. i, p. 118, 1842.

Cervus (Strongyloceros) canadensis, *Gray, Cat. Ungulata Brit. Mus.* p. 193, 1852.

Strongyloceros canadensis, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxvii, pt. 1, p. 350, 1873, vol. lxix, pt. i, p. 556, 1874.

Cervus maral canadensis, *Severtzow, Turkestan. Jevotnie*, 1873, p. 103, *Ann. Mag. Nat. Hist.* ser. 4, vol. xviii, p. 386, 1876.

Wapiti: miscalled Elk in America.

Typical locality Eastern Canada.

Size very large, shoulder-height reaching 5 feet 4 inches.

Antlers very large, with more than five tines, curving backwards, and much flattened in the upper half; bez-tine present, fourth tine longer than all the others, and with the fifth, which is also long, forming a nearly symmetrical fork, the fourth, fifth, and sixth tines being situated nearly in the

Fig. 24.—Head of Wapiti (*Cervus canadensis*).

same plane as the portion of the beam immediately below them, so as more or less nearly to occlude one another when viewed from the front; brow-tine rising close to the burr, and approximately equal in length to the bez; crown normally not cupped; rump-patch very large; throat-fringe greatly developed; tail very short; ears about half the length

of head; face rather short; general colour in summer yellowish brown, sometimes with a reddish tinge; neck and under-parts varying from dark brown to blackish; and in winter contrasting sharply with the straw-colour of the bleached coat of the back; limbs generally chestnut-brown.

The distributional area includes North America and Central and North-eastern Asia.

The following is a "key" to the American races:—

A. Size larger.
  *a*. Smaller and lighter-coloured, with lighter antlers ..... *C. c. canadensis.*
  *b*. Larger and darker, with heavier antlers..... *C. c. occidentalis.*
  *c*. Nose darker, and head and legs redder than in *a*, but not so dark as in *b*; skull more massive than in either *a* or *b* ..... *C. c. merriami.*
B. Size smaller..... *C. c. nannodes.*

The Asiatic races are not sufficiently well known, as a whole, to admit of their being tabulated in this manner.

## A.—Cervus canadensis canadensis.

Cervus canadensis typicus, *Lydekker*, *Deer of All Lands*, p. 96, 1898; *Ward*, *Records of Big Game*, ed, 6, p. 40, 1910, ed. 7, p. 40, 1914.
Cervus canadensis canadensis, *Miller*, *List N. Amer. Mamm.* p. 385, 1912.

Wapiti.

Typical locality Eastern Canada.

General characters those of the species.

The range extends southwards and westwards to include the Rocky Mountains.

690, *b*, *c*, *c*$^1$, *d*. Four frontlets, with antlers. North America. *No history.*

690, *f*. Single antler of an immature stag. Shed in Zoological Society's Gardens, May, 1863.
*Purchased* (*Zoological Society*), *about* 1863.

53. 8. 29. 43. Skin, young, mounted, from a stag born in London. *Purchased* (*Zoological Society*), 1853.

58. 6. 9. 19. Skull, with antlers. North America.
*Purchased* (*Zoological Society*), 1858.

76. 3. 15. 1. Skeleton, with antlers. Yellowstone Park.
*Purchased* (*H. Ward*), 1876.

84. 5. 28. 1. Skin, mounted. Yellowstone.
*Purchased (H. Ward)*, 1876.

11. 3. 28. 1. Body-skin. Gros Ventre Basin, N.W. Wyoming.
*Presented by the Hon. L. V. Kay-Shuttleworth*, 1911.

## B.—Cervus canadensis occidentalis.

Cervus occidentalis, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 101, vol. v, p. 308, 1827; *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 139, 1835; *Lesson*, *Nouv. Tabl. Règne Anim.*, *Mamm.* p. 171, 1842; *Stone and Cram*, *American Mammals*, p. 34, 1903.

Elaphus occidentalis, *Swainson*, *Classif. Quadrupeds*, p. 292, 1835.

Cervus canadensis occidentalis, *Blyth*, *Proc. Zool. Soc.* 1865, p. 618; *Lydekker*, *Deer of All Lands*, p. 101, 1898, *Great and Small Game of Europe, etc.* p. 56, 1901; *Elliot*, *Zool. Pub. Field Mus.* vol. i, p. 269, 1899, *Synop. Mamm. N. Amer.* (*Zool. Pub. Field Mus.* vol. ii) p. 34, 1901, *Cat. Mamm. Field Mus.* (*op. cit.* vol. viii) p. 44, 1907; *Ward*, *Records of Big Game*, ed. 6, p. 44, 1910, ed. 7, p. 44, 1914; *Miller*, *List N. Amer. Mamm.* p. 385, 1912.

Strongyloceros occidentalis, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 563, 1874.

Cervus roosevelti, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xi, p. 271, 1897.

Typical locality the Pacific coast of North America.

Larger and darker-coloured than typical race, with heavier antlers.

The distributional area includes the Coast Range of Washington, Oregon, and Northern California.

690, *a*. Frontlet and antlers. San Diego, California.
*Presented by C. Pentland, Esq.*

98. 2. 26. 1. Skull, with antlers. Vancouver Island, British Columbia. *Presented by H. J. Elwes, Esq.*, 1898.

## C.—Cervus canadensis merriami.

Cervus merriami, *Nelson*, *Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 7, 1902; *Stone and Cram*, *American Mammals*, p. 34, 1903; *Elliot*, *Check-List Mamm. N. Amer.* (*Zool. Pub. Field Mus.* vol. vi) p. 42, 1905; *Miller*, *List N. Amer. Mamm.* p. 385, 1912.

Typical locality Black River Valley, White Mountains, Arizona.

Type in U.S. National Museum, Washington.

Nose darker and head and limbs redder than in typical

race, although not so dark as in *occidentalis;* tines of antlers less curved than in typical race; nasals broader and flatter; upper series of cheek-teeth stouter and more curved.

### D.—Cervus canadensis nannodes.

(?) Cervus maral californica, *Severtzow, Turkestan. Javotnie*, 1873, p. 103, *Ann. Mag. Nat. Hist.* ser. 4, vol. xviii, p. 386, 1876.

Cervus nannodes, *Merriam, Proc. Biol. Soc. Washington*, vol. xviii, p. 83, 1905; *Elliot, Check-List Mamm. N. Amer.* (*Zool. Pub. Field Mus.* vol. vi) p. 42, 1905; *Miller, List N. Amer. Mamm.* p. 385, 1912.

Typical locality Buttonwillow, Kern County, California.

Type in U.S. National Museum, Washington.

Size smaller and legs relatively shorter than in any of the preceding races; general colour pale and rump-patch small in comparison with that of other races. There are also skull-differences.

The range appears to be mainly, if not entirely, restricted to the San Joaquin Valley, but formerly included the higher ridges of the White and Mogollon Mountains of Arizona and New Mexico.

No specimen in collection.

### E.—Cervus canadensis xanthopygus.

Cervus elaphus, *Pallas, Zoogr. Rosso-Asiat.* p. 216, 1811; *Schrenck, Reis. und Forsch. im Amur-Lande*, vol. i, p. 171, 1851; *Radde, Reise Süd-Ost-Sibirien*, pt. i, p. 284, 1862; nec *Linn.*

Cervus xanthopygus, *Milne-Edwards, Ann. Sci. Nat. Zool.* ser. 5, vol. viii, p. 376, 1869, *Rech. Mamm.* p. 181, pl. xxi, 1870–74; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 590, 1874; *Brooke, Proc. Zool. Soc.* 1878, p. 68; *Lydekker, Deer of All Lands*, p. 81, pl. iii, 1898; *Pousargues, Mém. Soc. Zool. France*, vol. xi, p. 205, 1898; *Allen and Andrews, Bull. Amer. Mus. Nat. Hist.* vol. xxxii, p. 488, 1813.

Cervus lühdorfi, *Bolau, Abh. Ver. Hamburg*, vol. vii, p. 33, pl. iv, 1880; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxxiii, p. 373, 1881; *Pousargues, Mém. Soc. Zool. France*, vol. xi, p. 209, 1898 (as a synonym of *xanthopygus*).

Cervus luehdorfi, *Sclater, List. Anim. Zool. Gardens*, p. 263, 1883.

Cervus isubra, *Noack, Humboldt*, vol. viii, p. 6, fig. 5, 1889.

Cervus bedfordianus, *Lydekker, Proc. Zool. Soc.* 1896, p. 932, pls. xxxviii and xxxix, *Deer of All Lands*, p. 101, 1898 (as a synonym of *xanthopygus*).

Cervus canadensis luehdorfi, *Lydekker, Deer of All Lands*, p. 102, 1898.

Cervus manchuricus typicus, *Pousargues, Mém. Soc. Zool. France*, vol. xi, p. 209, 1898.

Cervus canadensis xanthopygus, *Lydekker, Great and Small Game of Europe, etc.* p. 70, 1901; *Ward, Records of Big Game*, ed. 6, p. 48, 1910, ed. 7, p. 48, 1914.

Isubra.

Typical locality Northern Manchuria, probably the Usuri district.

Type in Paris Museum.

Antlers of a shorter and stouter type than in the Tien-shan race (*infra*), with the fourth tine relatively smaller in immature individuals, and the portion above it less developed at all ages; the tips of the fourth and fifth tines in the 5-tined antlers of subadult stags curving towards one another like the "pincers" of a crab. General colour of immature and subadult individuals in summer bright reddish brown, in some cases without a distinct rump-patch, in older animals (*luehdorfi*) browner; in winter brownish grey, with the dark neck-mane and under-parts of typical wapiti.

97. 12. 23. 1. Head, mounted, and body-skin. Manchuria. Type of *C. bedfordianus*.

*Presented by the Duke of Bedford, K.G.*, 1897.

99. 2. 20. 1. Skin, mounted. Manchuria.

*Same donor*, 1899.

99. 8. 30. 1–3. Three frontlets, with antlers. Sutschan Valley, 280 miles east of Vladivostock, north of Manchuria. These represent the so-called *C. luehdorfi*. *Same history.*

### F.—Cervus canadensis baicalensis nom. n.

Cervus maral *var.* sibirica, *Severtzow, Turkestan. Jevotnie*, 1873, p. 109, *Ann. Mag. Nat. Hist.* ser. 4, vol. xviii, p. 386, 1876;* *nec* Cervus sibiricus, *Schreber*, 1784.

Cervus canadensis asiaticus, *Lydekker, Deer of All Lands*, p. 102, pl. vi, 1898, partim, *Great and Small Game of Europe, etc.* p. 67,

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* Severtzow's classification is as follows:—

*Cervus maral* (= *C. wapiti*).

| A. Var. *Americana.* | B. Var. *Asiatica.* |
|---|---|
| *a. canadensis.* | *a. sibirica.* |
| *b. californica.* | *b. songarica.* |

Hitherto the writer has used the name *asiaticus* for the present race, but he is now of opinion that Severtzow did not intend "Americana" and "Asiatica" to be used as technical names.

1901, *Field*, vol. cxi, p. 70, 1908; *Elwes, Journ. Linn. Soc., Zool.* vol. xxiv, p. 39, 1899; *Ward, Records of Big Game*, ed. 6, p. 47, 1910; *Méhely, Termt. Közl. Budapest*, vol. xlii, p. 806, 1910.

Cervus sibiricus, *Matschie, Sitzber. Ges. nat. Freunde*, 1907, p. 222.

Cervus canadensis sibiricus, *Lydekker, Field*, vol. cxi, p. 70, 1908, as an alternative name; *Ward, Records of Big Game*, ed. 7, p. 47, 1914.

Typical locality Sayansk and Baikal Mountains, west of Lake Baikal.

Compared with those of the next race, the antlers, according to Matschie, are less stout and lighter in colour, and have the fourth tine inclining outwards instead of inwards, with only a slight bend at the tip, and the beam at this point curving gradually inwards and backwards, with the backward inclination less marked than in the Tien-Shan race. On the front surface of the upper half of the beam there is only one large tine (the fourth), the terminal portion forming a long-handled but short-tined fork. This terminal fork inclines inwards from the line of the summit of the fourth tine, and also somewhat inwards from that of the third tine, while between the third and fourth tines there is no sharp inward angulation of the beam.*

The range apparently includes a portion of the Altai, as well as part of the district to the southward of Lake Teletsk, near the sources of the Yenisei (whence the stag figured in *The Deer of All Lands* probably came). Whether the somewhat darker wapiti from the Krasnoyarsk district of the Upper Yenisei is identical with this race, is still uncertain.

78. 11. 21. 24. Antlers. Salair, Altai; collected by Dr. O. Finsch. *By exchange with the Geographical Society of Bremen*, 1878.

97. 5. 18. 2. Head-skin. Chuja Steppe, Altai. *Presented by Major C. S. Cumberland*, 1897.

* The above details (as in the case of several of the other races) are given solely on the authority of Matschie. A mounted specimen of the present race in the Tring Museum appeared to the writer very similar to the undermentioned example of the next race. As a rule, however, the mammals of the Altai are distinct from those of the Tien-Shan.

## G.—Cervus canadensis songaricus.

Cervus maral *var.* songarica, *Severtzow*, *Turkestan. Jevotnie*, p. 109, 1873, *Ann. Mag. Nat. Hist.* ser. 4, vol. xviii, p. 386, 1876.

Cervus eustephanus, *Blanford*, *Proc. Zool. Soc.* 1875, p. 637, *Scient. Results Second Yarkand Mission*, *Mamm.* p. 90, 1875; *Brooke*, *Proc. Zool. Soc.* 1878, p. 912; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 184, 1891; *Pousargues*, *Bull. Mus. Paris*, 1895, p. 266; *Ward*, *Records of Big Game*, ed. 2, p. 42, 1896; *Gillett*, *Proc. Zool. Soc.* 1904, vol. ii, p. 179; *Bentham*, *Cat. Asiat. Horns and Antlers Ind. Mus.* p. 66, 1908.

Cervus canadensis eustephanus, *Blanford*, *Proc. Zool. Soc.* 1893, p. 447.

Cervus canadensis asiaticus, *Lydekker*, *Deer of All Lands*, p. 108, 1898, partim.

Cervus xanthopygus eustephanus, *Pousargues*, *Mém. Soc. Zool. France*, vol. xi, p. 211, 1898.

Cervus canadensis songaricus, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 59, 1901, *Field*, vol. cxi, p. 70, 1908; *Ward*, *Records of Big Game*, ed. 6, p. 45, 1910, ed. 7, p. 45, 1914.

Cervus songaricus, *Matschie*, *Sitzber. Ges. nat. Freunde*, 1907, p. 222.

Typical locality the Zungarian Tien-Shan, probably in the neighbourhood of Kulja.

Very similar to the typical American race, but apparently distinguished by the narrower and more orange-coloured rump-patch, not including the middle line of the tail, which is coloured like the back; the larger amount of black on the borders of the rump-patch, thighs, and flanks, the greyer general colour in summer, and the shorter and stouter fourth tine of the antlers. Compared with those of the other Asiatic races, the antlers are stated by Matschie to be distinguished by their stoutness and the length and massiveness of their tines, as well as by their dark colour. From the trez-tine the beam inclines slightly inwards towards the root of the fourth tine, which is very large and strongly bent inwards; at the root of the fourth tine the beam is markedly bent inwards and backwards, all the tines on its front surface being long, stout, parallel, and nearly at right angles to its axis. The upper portion of the antler in fully developed specimens is 3-tined, and placed practically in the same place as the tip of the fourth, and nearly in that of the tip of the third tine.

The range includes the Tarbagatai district.

79. 11. 21. 50–52. Three shed antlers. Tien-Shan; col-

lected during the Second Yarkand Mission, under Sir Douglas Forsyth, K.C.S.I., 1873. Co-types of *C. eustephanus*.

*Transferred from India Museum*, 1879.

2. 3. 9. 8. Skin, mounted. Eastern Tien-Shan.

*Presented by St. George Littledale, Esq.*, 1902.

2. 3. 9. 9. Skull and antlers. Same locality.

*Same history.*

14. 9. 15. 8. Skin, imperfect. Chik Jirgalan Nulla, Tekkes Valley, Tien-Shan.

*Presented by Col. J. W. Abbot Anderson*, 1914.

## H.—Cervus canadensis biedermanni.

Cervus asiaticus sibiricus, *Elwes*, *Journ. Linn. Soc.* 1899, p. 32; nec C. maral sibirica, *Severtzow*.

Cervus biedermanni, *Matschie*, *Sitzber. Ges. nat. Freunde*, 1907, p. 223.

Cervus canadensis biedermanni, *Lydekker*, *Field*, vol. cxi, p. 70, 1908; *Ward*, *Records of Big Game*, ed. 6, p. 48, 1910, ed. 7, p. 48, 1914.

Typical locality Lake Teletzk, at the source of the Obi, and Barnaul, somewhat lower down the same valley.

According to Matschie's description, the beam of the antlers is but slightly curved and forms an almost continuous line with the axis of the fourth tine, which is relatively small; no inward bending occurs till the fourth tine, the tip forms a long-handled fork, and the maximum span occurs at the root of the fourth tine, as in the Sayansk race, but the terminal fork inclines only slightly inwards, so that in a front view it is concealed by the fourth tine, which in *sibiricus* inclines outwards.

No specimen in collection.

## I.—Cervus canadensis wachei.

Cervus wachei, *Noack*, *Zool. Anz.* vol. xxv, p. 145, 1902; *Matschie*, *Sitzber. Ges. nat. Freunde*, 1907, p. 228.

Cervus canadensis wachei, *Lydekker*, *Field*, vol. cxi, p. 70, 1908.

Typical locality Shingielt Valley, in the neighbourhood of the Black Irtish, Kobdo, Eastern Zungaria.

Distinguished, according to Matschie, from the three

preceding races by the very strong incurving of the upper portion of the stout beam of the antlers, in consequence of which the base of the terminal fork is situated in nearly the same plane as the root of the trez-tine; the latter strongly bent upwards and inwards and separated by a shorter interval from the fourth tine than it is from the bez-tine; while the fourth tine conceals the terminal fork, which consists of two sub-equal prongs mounted upon a relatively short shaft.

No specimen in collection.

### J.—Cervus canadensis bactrianus.

Cervus bactrianus, *Lydekker*, *Ann. Mag. Nat. Hist.* ser. 7, vol. v, p. 196, 1900.

Cervus hagenbecki, *Shitkow*, *Zool. Jahrb., Syst.* vol. xx, p. 91, 1905; = bactrianus, *Satunin*, *Zanucok. Kaukas. Omd.* vol. xxv, p. 38, 1905.

Cervus canadensis bactrianus, *Lydekker*, *Proc. Zool. Soc.* 1902, vol. ii, p. 79; *Ward*, *Records of Big Game*, ed. 6, p. 47, 1908, ed. 7, p. 47, 1914.

Typical locality Russian Turkistan, probably Bokhara.

In the under-mentioned specimen the whole margin of the upper lip is light-coloured, instead of only the front portion and a patch beside the nostrils, as in the Tien-Shan and Canadian races; and the dark patch on each side of the lower lip does not extend downwards to join a larger patch on the chin, as in those races, the whole chin being light-coloured. General colour light grey.

2. 3. 19. 1. Head, mounted. Chenkend, Turkestan.
*Presented by the Duke of Bedford, K.G.*, 1902.

### K.—Cervus canadensis wardi.

Cervus canadensis wardi, *Lydekker*, *Proc. Zool. Soc.* 1910, p. 987.

Typical locality Sze-chuan border of Tibet.

Known only by antlers, which are lighter and more slender than those of Sayansk and Tien-Shan wapiti, with the terminal fork narrower, and the fourth tine smaller. Not improbably this type of antler may prove to belong to *C. macneilli* (*infra*, p. 145).

10. 5. 14. 1. Two detached antlers. Sze-chuan border of Tibet; collected by the Rev. W. N. Fergusson. Type.
*Presented by J. Rowland Ward, Esq.*, 1910.

## XVII. CERVUS YARKANDENSIS.

Cervus cashmirianus yarkandensis, *Blanford*, *Proc. Zool. Soc.* 1892, p. 117; *Lydekker*, *Deer of All Lands*, p. 88, 1898.

Cervus yarkandensis, *Blanford*, *Proc. Zool. Soc.* 1893, p. 447; *Lydekker*, *ibid.* 1896, p. 933, *Game Animals of India, etc.** p. 215, 1907, *Cat. Hume Bequest Brit. Mus.* p. 34, 1913; *Pousargues*, *Mém. Soc. Zool. France*, vol. xi, p. 202, 1898, partim; *Ward*, *Records of Big Game*, ed. 6, p. 35, 1910, ed. 7, p. 47, 1914.

Typical locality Maralbashi Forest, Eastern Turkestan; the range includes the Tarim Valley.

A rufous-fawn deer, with a large and well-defined orange rump-patch, which includes the tail, and usually five-tined antlers, which lack the lateral compression and large fourth tine of those of the *canadensis* group, and have the terminal fork placed at right angles to the middle line of the head, so as to look directly forwards, and the fifth tine a little inclined inwards, the beam not showing any marked angulation at the origin of the third tine. By the development of a third snag to the terminal fork (crown) the antlers may become 6-tined, as in fig. 25.

79. 11. 21. 252. Skin, young. Yarkand.
*Transferred from India Museum*, 1879.

89. 6. 8. 3. Skull and antlers. Maralbashi Forest; collected by Rev. H. Lansdell. *Purchased*, 1889.

91. 8. 7. 4. Skull and antlers. Same locality; collected by Mr. A. Dalgliesh. Type; figured by Blanford, *loc. cit.* Length of antlers along outer curve 35 and 34 inches; basal girth $6\frac{3}{4}$ inches. *Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 5. Frontlet and antlers. Same locality and collector. *Same history.*

92. 3. 30. 1. Skin. Tarim Valley, Eastern Turkestan. Mentioned by Blanford, *loc. cit.*
*Presented by Major C. S. Cumberland*, 1892.

* Name spelt, intentionally, *yarcandensis*.

92. 7. 17. 1. Frontlet and antlers. Maralbashi. Length of antlers 41½ inches, which is the maximum on record.
*Presented by Sir H. A. H. F. Lennard, Bart.*, 1892.

Fig. 25.—Skull and Antlers of Yarkand Stag (*Cervus yarkandensis*). The development of a third tine in the terminal fork renders this specimen less typical than most examples.

12. 10. 31. 3. Skull and antlers (fig. 25). Maralbashi; collected by Mr. A. Dalgliesh. This specimen stands fourth in Ward's 1910 list. The measurements of the antlers are:—length on outer curve 39½, girth 6, tip-to-tip 24½, widest inside span 25 inches. *Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

## XVIII. CERVUS WALLICHI.

Cervus wallichi, *Cuvier, Ossemens Fossiles*, 1812 (teste *Pousargues*), ed. 3, vol. iv, p. 504, 1825, ed. 4, vol. vi, p. 89, 1835; *F. Cuvier, Hist. Nat. Mamm.* vol. ii, livr. xxxix, pl. 225 (356), 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 103, pl. ix, 1827; *J. B. Fischer, Synop. Mamm.* p. 452, 1829; *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 161, pl. x, 1835; *Blyth, Journ. Asiat. Soc. Bengal*, vol. x, pt. 2, p. 745, 1841, vol. xxi, p. 341, 1852; *Gray, Proc. Zool. Soc.* 1850, p. 227, partim; *Pousargues, Mém. Soc. Zool. France*, vol. xi, p. 195, 1898, partim; *Pocock, Proc. Zool. Soc.* 1912, p. 574; *Lydekker, Field*, vol. cxx, p. 86, 1912, *Cat. Hume Bequest Brit. Mus.* p. 32, 1913, *Ward's Records of Big Game*, ed. 7, p. 37, 1914.

Cervus (Harana) wallichi, *Hodgson, Ann. Nat. Hist.* vol. i, p. 158, 1838.

Cervus (Pseudocervus) wallichi, *Hodgson, Journ. Asiat. Soc. Bengal*, vol. x, pt. 2, p. 914, 1841.

Cervus tibetanus, *Hodgson, op. cit.* vol. xix, p. 460, 1850.

Cervus nariyanus, *Hodgson, op. cit.* vol. xx, p. 392, pl. viii, 1851.

Cervus affinis, *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 184, 1891, partim; *Lydekker, Proc. Zool. Soc.* 1909, p. 599, fig. 182; nec *Hodgson*.

Shou.

Typical locality probably the wooded country to the south of the Mansarowar Lake, in the Nari-Khorsum district of Tibet, whence the stag to which the typical pair of antlers belonged appears to have been brought to Maktinath, lying to the northward of Dwalagiri, central Nepal.

Type a stag in the Vice-Regal Menagerie at Barrakpur, near Calcutta; now represented only by a pair of shed antlers in the Indian Museum, Calcutta.

Type of *Harana* and *Pseudocervus*.

Somewhat inferior in size to a wapiti (shoulder-height about 4 feet 3 or 4 inches), with a very short tail, the (normally) 5-tined antlers (fig. 26), strongly angulated at the origin of the third tine, and above this inclined markedly forwards and inwards so that the tips of the fifth tines (which are much larger than the fourth) are more or less closely approximated; general colour speckled earthy or pale fawn brown, with a larger or smaller white rump-patch, including tail and extending downwards posteriorly on to back of hams; * ears long and pointed; muzzle and chin dark.

* In Pocock's key to this group (*Proc. Zool. Soc.* 1912, p. 574) the white on hind-quarters is stated to extend above root of tail in *wallichi* and *affinis*, but not to do so in *cashmiriensis* (*hanglu*), and yet further on *affinis* is stated to come closest to *cashmiriensis* in this respect.

The range apparently includes the Nari Khorsum district and the neighbourhood of Lhasa, Tibet, and the Chambi Valley and Bhutan.

The two races are distinguishable as follows :—

A. Rump-patch large, undivided by a dark median line *C. w. wallichi.*

B. Rump-patch smaller, divided more or less completely by a dark median line..... *C. w. affinis.*

## A.—Cervus wallichi wallichi.

Cervus wallichi wallichi, *Lydekker*, *Cat. Hume Bequest Brit. Mus.* p. 32, 1913.

Typical locality probably the wooded country south of the Mansarowar Lake, Nari Khorsum, Western Tibet.

General colour earthy brown; rump-patch large and undivided by a median dark line.

15. 5. 11. 1. Pair of antlers shed in 1913 by a stag, from the neighbourhood of the Mansarowar Lake, presented to the Zoological Society by H.M. the King. This stag is the one described when young by the present writer, *Proc. Zool. Soc.* 1909, p. 599, and, when grown up, by Pocock, *ibid.* 1912, p. 574. *Presented by the Zoological Society*, 1914.

## B.—Cervus wallichi affinis.

Cervus affinis, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. x, pt. 2, p. 721, 1841, vol. xix, pp. 466 and 518, 1850, vol. xx, p. 392, pl. vii, 1851; *Gray*, *Proc. Zool. Soc.* 1850, p. 228, *Cat. Ungulata Brit. Mus.* p. 199, 1852, *Cat. Ruminants Brit. Mus.* p. 69, 1872, *Hand-List Ruminants Brit. Mus.* p. 140, 1873; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 69, 1862; *Jerdon*, *Mamm. India*, p. 251, 1867; *Selater*, *Trans. Zool. Soc.* vol. vii, p. 343, 1871; *Brooke*, *Proc. Zool. Soc.* 1878, p. 913; *Sterndale*, *Mamm. India*, p. 514, 1884; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 184, 1891; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 537, 1891; *Lydekker*, *Deer of All Lands*, p. 88, 1898, *Game Animals of India*, *etc.* p. 215, 1907; *Bentham*, *Cat. Asiat. Horns and Antlers Ind. Mus.* p. 62, 1908; *Ward*, *Records of Big Game*, ed. 6, p. 37, 1910; *Pocock*, *Proc. Zool. Soc.* 1912, p. 572, *Field*, vol. cxxiv, p. 613, 1914.

Pseudocervus wallichi, *Gray*, *List Mamm. Brit. Mus.* p. 180, 1843.

Cervus wallichi, *Pousargues*, *Mém. Soc. Zool. France.* vol. xi, p. 195, 1898, partim.

Cervus wallichi affinis, *Lydekker*, *Cat. Hume Bequest Brit. Mus.* p. 32, 1913, *Ward's Records of Big Game*, ed. 7, p. 37, 1914.

Shou.

Typical locality probably the Chambi Valley of Sikhim; the range extends into Bhutan and the Tsari district of Tibet, and apparently also the neighbourhood of Lhasa.

General colour pale fawn-brown, lighter on flanks; rump-patch much smaller than in typical race, and more or less

Fig. 26.—Skull and Antlers of Sikhim Shou (*Cervus wallichi affinis*).

completely divided by a median dark line continuous with the fawn-brown of the back, and extending on to tail; in some cases a darker brown border to front edge of rump-patch.

The finest known antlers are in the Museum collection, four specimens in which head Ward's 1910 list.

45. 1. 8. 94. Skull and antlers. Probably the Chambi Valley, Sikhim. Type; figured by Hodgson, *Journ. Asiat. Soc. Bengal*, vol. x, p. 722.

*Presented by B. H. Hodgson, Esq.*, 1845.

57. 12. 14. 2. Skull, with antlers, and skin. Probably Sikhim or Bhutan; collected by B. H. Hodgson, Esq.

*Transferred from Zoological Society's Museum*, 1857.

57. 12. 14. 3. Pair of antlers. Chambi Valley; collected by Dr. J. Campbell, Superintendent of Darjiling at the time of Hooker's Himalayan journeys. *Same history.*

66. 8. 10. 5. Skull. Locality unknown; collected by Dr. Hugh Falconer. *Purchased*, 1866.

692, *f.* Frontlet and antlers (in Geological Department). Locality unknown. *No history.*

79. 11. 21. 49. Skull and antlers. Locality unknown.

*Transferred from India Museum*, 1879.

79. 11. 21. 668. Head, mounted. Tibet (?); collected by B. H. Hodgson, Esq. *Same history.*

91. 8. 7. 6. Skull and antlers. Northern Bhutan; collected by L. Mandelli, Esq.

*Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 8. 7. 7. Skull and antlers. Same locality and collector.

*Same history.*

91. 10. 7. 172. Skin. Sikhim; same collector.

*Presented by Dr. W. T. Blanford*, 1891.

91. 10. 7. 173. Skull and skin, immature. Same locality and collector. *Same history.*

12. 10. 31. 4. Skull and antlers (fig. 26). Northern Bhutan; same collector. In this specimen, which stands No. 1 in Ward's 1910 list, the dimensions of the antlers are as follows: length on outer curve $55\frac{3}{4}$, girth $6\frac{1}{2}$, tip-to-tip $17\frac{1}{4}$, widest inside span $40\frac{3}{8}$ inches.

*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

14. 8. 29. 1. Skull, with antlers in velvet, and skin. Chosam, Tsari district, Tibet. Figured by Pocock, *Field*, vol. cxxiv, p. 613. *Presented by Capt. F. M. Bailey*, 1914.

## XIX. CERVUS MACNEILLI.

Cervus cashmirianus macneilli, *Lydekker*, *Proc. Zool. Soc.* 1909, p. 588, pl. lxix, 1910, p. 987.
Cervus macneilli, *Pocock*, *Proc. Zool. Soc.* 1912, p. 571.

Typical locality Sze-chuan border of Tibet.

Antlers (in *C. m. kansuensis*) 5-tined, but of a more wapiti-like type than in the preceding species, the two tines of the terminal fork being apparently in a fore-and-aft plane, or nearly so; general colour ranging from light speckled grey to speckled brown, with the white of the hind-quarters restricted to back of hams, the middle line of tail dark, and a blackish brown patch on croup, replacing the white one of *C. wallichi affinis;* ears and muzzle of the same type as in latter.

Whether the antlers described under the name of *C. canadensis wardi* (*supra*, p. 138) really belong to this species, remains to be proved.

The distributional area extends from the Sze-chuan border of Tibet to Kan-su and Yun-nan.

The two races are distinguished as follows :—

A. General colour grey, tail almost wholly black above ..... *C. m. macneilli.*
B. General colour brown, tail with a sinous black median line ..... *C. m. kansuensis.*

### A.—Cervus macneilli macneilli.

General colour pale speckled French grey, becoming somewhat darker on back and still more decidedly so on head, with the greater part of upper side of tail black. Male unknown.

Typical locality Sze-chuan border of Tibet.

9. 5. 31. 1. Skin, female, mounted. Sze-chuan border of Tibet.* Type. *Presented by Major M. Macneill*, 1909.

* In the original description the locality was given as Sze-chuan.

### B.—Cervus macneilli kansuensis.

Cervus kansuensis, *Pocock*, *Proc. Zool. Soc.* 1912. p. 573; *Wallace*, *Big Game of Central and Western China*, pp. 195 and 296, 1913.*
Cervus macneilli kansuensis, *Lydekker*, *Field*, vol. cxx, p. 860, 1912.

Typical locality Kan-su, China.

General colour speckled brown; tail with an irregular sinuous median dark line on upper surface. The finest pair of antlers recorded by Wallace measure 43¼ inches in length along the curve, with a basal girth of 5½, and a tip-to-tip interval of 37 inches.

The range apparently includes Yunnan.

12. 7. 26. 16. Skin, female. Thirty miles S.E. of Tao-chou, Kan-su, at a height of about 11,000 feet; shot by Dr. J. A. C. Smith, March 23, 1911. Type.

*Purchased* (*Rosenberg*), 1912.

## XX. CERVUS CASHMIRIENSIS.

Cervus hanglu, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 352, 1844; *Pocock*, *Proc. Zool. Soc.* 1912, p. 566.

Cervus cashmerensis, *Gray*, *List Osteol. Brit. Mus.* p. 65, 1847, nomen nudum.

Cervus casperianus, *Gray*, *List Osteol. Brit. Mus.* p. 147, 1847, *Cat. Ungulata Brit. Mus.* pl. xxvii, figs. 1–3, 1852, to replace cashmerensis.

Cervus wallichi, *Gray*, *Cat. Ungulata Brit. Mus.* p. 197, 1852; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 258, 1862; *Jerdon*, *Mamm. India*, p. 250, 1867; *Kinloch*, *Large Game of Tibet*, p. 44, 1869; nec *Cuvier*.

Cervus cashmeriensis, *Adams*, *Proc. Zool. Soc.* 1858, p. 529; *Lydekker*, *Journ. Asiat. Soc. Bengal*, vol. xlvi, pt. 2, p. 286, 1877.

Cervus cashmeerianus, *Falconer*, *M.S.*, in *Falconer's Palæontological Memoirs*, vol. i, p. 576, 1868; *Sclater*, *Trans. Zool. Soc.* vol. vii, p. 339, pl. xxx, 1871; *Gray*, *Cat. Ruminants Brit. Mus.* p. 68, 1872, *Hand-List Ruminants Brit. Mus.* p. 140, 1873; *Brooke*, *Proc. Zool. Soc.* 1878, p. 912; *Pousargues*, *Mém. Soc. Zool. France*, vol. xi, p. 199, 1898; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 184, 1891; *Bentham*, *Cat. Asiat. Horns and Antlers Ind. Mus.* p. 60, 1908.

Cervus cashmirianus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 586, 1874; *Sterndale*, *Mamm. India*, p. 512, 1884;

* Of the figures of the Kan-su deer in this work the only ones of any value are those in the plate facing p. 206, which are from photographs; the others appear to have been drawn from true wapiti.

*Scully, Ann. Mag. Nat. Hist.* ser. 5, vol. xx, p. 388, 1887; *Blanford, Fauna Brit. India, Mamm.* p. 355, 1891; *Lydekker, Deer of All Lands*, p. 83, pl. iv, 1898, *Game Animals of India, etc.* p. 208, 1907, *Cat. Hume Bequest, Brit. Mus.* p. 33, 1913; *Ward, Records of Big Game*, ed. 6, p. 32, 1910, ed. 7, p. 32, 1914.

HANGUL OR HANGLU.

Typical locality Valley of Kashmir.

Size approximately that of a red deer. Antlers, which, although normally 5-tined, may carry six or seven points on each side, approximating to those of *C. wallichi affinis*, but with the angle at origin of third tine and the forward inclination of upper part of beam less strongly marked; white area on hind-quarters, which is bordered in front with black, restricted to hind part of hams, and upper side of tail mainly dark; chin and lower lip white or whitish, and muzzle pale fawn, lighter than rest of face; ears bluntly pointed, with straight upper border; general colour speckled ashy brown, much as in *C. wallichi affinis*. Fine antlers measure from 44 to 48 inches along the outer curve, with a girth of from $5\frac{5}{8}$ to $7\frac{3}{8}$, and a tip-to-tip interval ranging from 13 to 35 inches.

The range includes the Valley of Kashmir, part of the adjacent Kishen-Ganga Valley, and, to the eastward, the Kishtwar district.

46. 8. 24. 1. Skull and antlers. Kashmir. Co-type of *C. cashmeerianus*, Falconer.

*Presented by Dr. H. Falconer*, 1846.

46. 8. 24. 2. Skull, female. Pampur Valley, Kashmir.

*Same history.*

56. 9. 22. 1. Skin. Kashmir; collected by Gen. Abbott.

*Purchased*, 1856.

63. 5. 8. 3. Pair of antlers. Kashmir.

*Purchased (Zoological Society)*, 1863.

63. 5. 13. 1. Pair of antlers. Shed by a stag in the Zoological Society's Gardens. *Same history.*

63. 5. 13. 2. Pair of antlers. *Same history.*

63. 5. 13. 3. Pair of antlers. *Same history.*

65. 7. 8. 3. Frontlet and antlers. Kashmir.

*Purchased (Zoological Society)*, 1865.

* * * *. Frontlet and antlers. From an old skin. Kashmir. *No history.*

66. 8. 6. 12. Skeleton and antlers. Kashmir.
*Purchased (Zoological Society)*, 1866.

79. 11. 21. 47. Frontlet and horns. Kashmir; collected by Dr. Hugh Falconer.
*Transferred from India Museum*, 1879.

FIG. 27.—HEAD OF HANGUL (*Cervus cashmiriensis*).

88. 3. 20. 21. Skull and antlers. Lidar Valley, Kashmir
*Presented by R. Lydekker, Esq.*, 1888.

91. 5. 7. 1. Skull and antlers. Sind Valley, Kashmir.
*Presented by A. O. Hume, Esq., C.B.*, 1891.

91. 5. 7. 2. Skull and antlers. Maharaja's preserve, Kashmir. *Same history.*

91. 5. 7. 3. Skull and antlers. Sind Valley.

*Same history.*

94. 5. 31. 1. Skin, mounted. Warapash, Sind Valley; collected by Major P. H. G. Powell-Cotton.

*Purchased (Gerrard)*, 1894.

12. 10. 31. 1. Skull and antlers. Sind Valley; collected by Mr. A. Dalgleish. This specimen is No. 24 in Ward's 1910 list. The measurements of the antlers are as follows: length on outer curve 43, girth 6, tip-to-tip interval 20, widest inside span 35 inches.

*Bequeathed by A. O. Hume, Esq., C.B.*, 1912.

12. 10. 31. 2. Skull and antlers. Same locality and collector. *Same history.*

## XXI. CERVUS ALBIROSTRIS.

Cervus albirostris, *Przewalski, Reise Tibet*, pp. 73 and 76, 1884, *Cat. Zool. Collect.* p. 16, 1887; *Pousargues, Bull. Mus. Paris*, 1897, p. 284, *Mém. Soc. Zool. France*, vol. xi, p. 215, 1898; *Lydekker, Deer of All Lands*, p. 91, pl. v, 1898, *Game Animals of India, etc.* p. 221, 1907; *Ward, Records of Big Game*, ed. 6, p. 38, 1910, ed. 7, p. 38, 1914; *Pocock, Proc. Zool. Soc.* 1912, p. 574.

Cervus sellatus, *Przewalski, loc. cit.* 1884.

Cervus dybowskii, *W. L. Sclater, Journ. Asiat. Soc. Bengal*, vol. lviii, pt. 2, p. 186, pl. xi, 1889; *Bentham, Cat. Asiat. Horns Ind. Mus.* p. 64, 1908; nec *Taczanowski*, 1876.

Cervus thoroldi, *Blanford, Proc. Zool. Soc.* 1893, p. 444, pl. xxxiv; *Lydekker, ibid.* 1896, p. 930.

Typical locality Nak-chan (Nan-chan), Tibet; also found in forest to the north of Lhasa.

Type in the Museum of the St. Petersburg (Petrograd) Academy of Sciences.

Of the approximate size of *C. cashmiriensis*. Distinguished from all the other members of the subgenus by the reversal of the coarse hair of the withers, to form a kind of hump, and the white muzzle, chin, under surface of lower jaw, and inside of ears, as well by the low position and large size of the gland-tuft on the hind-shanks. Antlers much flattened, nearly white in colour, without a bez-tine, and bending suddenly backwards at origin of third tine, which is the longest.

92. 16. 11. 1. Skin, mounted (fig. 28), and skull. Tibet; collected by Dr. W. G. Thorold. Type of *C. thoroldi*.
*Purchased* (*Gerrard*), 1892.

Fig. 28.—Head and Neck of Thorold's Deer (*Cervus albirostris*).

## Incertæ Sedis.

1. Cervus lepidus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 180, 1846; *Brooke, Proc. Zool. Soc.* 1878, p. 902.

Rusa lepida, *Gray, Knowsley Menagerie*, p. 63, 1850, *Cat. Ungulata Brit. Mus.* p. 212, 1852; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 302, 1874.

Brooke stated that he saw the type in the Museum at Frankfort, and that it appeared closely to resemble *Cervus nippon*. On a second visit it could not be found.

2. Cervus caspicus, *Brooke, Proc. Zool. Soc.* 1874, p. 47, 1878, p. 909; *Lydekker, ibid.* 1897, p. 38, *Deer of All Lands*, p. 186. 1898.

This species was named on the evidence of a frontlet and antlers from the district south-west of the Caspian, which was figured in 1874 when in the collection of Sir Victor Brooke, where it could not be discovered at his death. The antlers measured 26 inches in length along the curve, and were three-tined. In his original description Brooke referred the species to the rusine group, comparing it to *C. unicolor* and *C. timoriensis*, but in 1878 he placed it provisionally in the sika group; the ground of this redetermination apparently resting on another antler from the Karun Valley, in the Luristan district of Persia, which may or may not have belonged to the same species as the type.

## VI. Genus ELAPHURUS.

Elaphurus, *Milne-Edwards, Ann. Sci. Nat.* ser. 5, vol. x, p. 380, 1866; *Brooke, Proc. Zool. Soc.* 1878, p. 906; *Cameron, Field*, 1892, April 30, p. 265, May 14, p. 703, May 21, p. 741, June 11, p. 860; *Lydekker, Deer of All Lands*, p. 233, 1898; *Pocock, Proc. Zool. Soc.* 1910, p. 945, 1912, p. 777.

Lateral metacarpals represented by their upper ends as in *Cervus;* no glands on front of pasterns; antlers large, cylindrical, and dichotomously forking at a comparatively short distance above the burr, with the front prong of the main fork curving forwards and again dividing once or more, and the hind prong long, straight, simple, and projecting backwards; muzzle with a large naked portion, deeper and broader below the nostrils than in the elaphine group, but extending only a little on to the front of the face, where its upper border is deeply concave; ears small and narrow; tail long, cylindrical, and bushy at the extremity; neck maned; face long; coat uniformly coloured, in young spotted; no tarsal tuft; metatarsal tuft continuous and situated in the upper third of the metatarsus; gland-pits and face-glands large; hoofs large and spreading; lateral hoofs very large; upper canines small; upper molars

moderately tall, with a small additional column on the inner side; vomer not dividing aperture of posterior nostrils into two chambers. Size large; build heavy, with the limbs stout. No foot-glands.

Much difference of opinion has existed as to the systematic position of this genus, which was regarded by Milne-Edwards as a very distinct type; the same view being maintained by Gray, who placed *Elaphurus* between the roes and the American deer. On the other hand, Sclater and Brooke included *Elaphurus* in *Cervus;* but Gordon Cameron, from the form of the antlers, reverted to the older view; while Pocock, who regards the front prong of the antlers as representing the brow-tine of *Cervus*, sides with Sclater and Brooke, although maintaining *Elaphurus* as a distinct genus. Garrod confessed his inability to identify the tines of the antlers with those of other deer.

The range is not definitely known, but seems to have included some part of Northern China and, it is said, Japan. The evidence in favour of the later country forming a part of the distributional area rests on a fragment of an alleged fossil antler described by Watasé.

## ELAPHURUS DAVIDIANUS.

Elaphurus davidianus, *Milne-Edwards*, *Ann. Sci. Nat.* ser. 5, vol. v, p. 380, 1866, *Arch. Mus. Paris*, vol. ii, p. 27, 1866; *Gray*, *Cat. Ruminants Brit. Mus.* p. 82, 1872, *Hand-List Ruminants Brit. Mus.* p. 154, 1873; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 329, 1874; *Garrod*, *Proc. Zool. Soc.* 1877, p. 16; *Lydekker*, *Deer of All Lands*, p. 236, pl. xix, 1898, *Proc. Zool. Soc.* 1901, vol. ii, p. 472, 1904, vol. ii, p. 178; *Ward*, *Records of Big Game*, ed. 6, p. 101, 1910, ed. 7, p. 78, 1914; *Pocock*, *Proc. Zool. Soc.* 1910, p. 945, 1912, p. 777; *Watasé*, *Zool. Mag. Tokyo*, vol. xxv, p. 487, 1913.

Cervus davidianus, *Sclater*, *Trans. Zool. Soc.* vol. vii, p. 331, 1871; *Brooke*, *Proc. Zool. Soc.* 1878, p. 906; *Ward*, *Records of Big Game*, ed. 2, p. 17, 1898; *Flower and Lydekker*, *Study of Mammals*, p. 320, 1891; *Lydekker*, *Horns and Hoofs*, p. 309, 1913.

Mi-lu; Père David's Deer.

The distribution is the same as that of the species, which is known only by the herd formerly kept in the gardens of the Summer Palace, Pekin, and their descendants.

Height at shoulder about 3 feet 9 inches, or about the size of a large red deer. Head large, with small eyes and ears, and a long, narrow muzzle; limbs stout; coat short and smooth, but longer on the middle line of chest and under-parts, and forming a mane on neck and throat; general colour reddish tawny with a tinge of grey, passing through an ill-defined darker band on the sides to a more decided whitish grey on the under-parts; neck, chest, and lower portion of throat dark brown; a blackish brown longitudinal stripe on neck and fore part of back, and another on chest; rump and inner sides of thighs yellowish white, passing gradually into the general colour of the body; inner sides of legs and entire shanks whitish yellow-grey; tail like back, except the terminal tuft, which is blackish brown; face brownish, with a blackish brown ring round each eye. Female somewhat lighter coloured. Young reddish brown with a tinge of yellow, at first profusely spotted with white. Fine antlers measure from 28 to 35⅝ inches along the outer curve, with a basal girth of from 4¾ to 7½ inches, and a tip-to-tip interval ranging from 13⅝ to 27¼ inches. In some cases, at any rate, the stags shed their antlers twice a year; but this may be a result of semi-domestication.

70. 6. 22. 14. Skin and skeleton (1538, *b*), female. From the herd in the gardens of the Summer Palace, Pekin.

*Purchased* (*Zoological Society*), 1870.

72. 12. 31. 3. Skin and skeleton, the latter (1538, *a*) mounted. Same locality. *Same history.*

98. 2. 25. 2. Head, mounted, and body-skin. From the descendants of the same herd at Woburn Abbey.

*Presented by the Duke of Bedford, K.G.*, 1848.

99. 7. 20. 1. Skin, mounted. From the Woburn herd.

*Same donor*, 1899.

## VII. Genus ODOCOILEUS.

Odocoileus, *Rafinesque*, *Atlantic Journ.* vol. i, p. 109, 1832; *Elliot*, *Synop. Mamm. N. America* (*Field Mus. Zool. Pub.* vol. ii), p. 38, 1901; *Pocock*, *Proc. Zool. Soc.* 1912, p. 780; *Miller*, *List N. Amer. Mamm.* p. 385, 1912.

Mazama, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 314, 1827 nec *Rafinesque*, 1817.

Dorcelaphus, *Gloger*, *Handbuch Naturgesch.* p. 140, 1841; *Lydekker*, *Deer of All Lands*, p. 248, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 962.

Cariacus, *Lesson*, *Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; *Gray*, *List Mamm. Brit. Mus.* p. 175, 1843, *Cat. Ruminants Brit. Mus.* p. 82, 1872; *Brooke*, *Proc. Zool. Soc.* 1878, p. 918; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 47, 1881.

Reduncina, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 373, 1844; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 357, 1873, vol. lxxviii, pt. 1, p. 312, 1879.

Macrotis, *Wagner*, *loc. cit.* 1844; nec *Dejaine*, 1833.

Eucervus, *Gray*, *Ann. Mag. Nat. Hist.* ser. 3, vol. xviii, p. 338, 1866, *Cat. Ruminants Brit. Mus.* p. 85, 1872; *Pocock*, *Proc. Zool. Soc.* 1910, p. 966.

Otelaphus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 356, 1873, to replace *Macrotis*.

Gymnotis, *Fitzinger*, *op. cit.* vol. lxxviii, pt. 1, p. 343, 1879.

Odocœlus, *Allen*, *Amer. Nat.* vol. xxxv, p. 449, 1901.

Dama, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 19, 1902; nec *H. Smith*, 1827.

Odontocœlus, *Elliot*, *Mamm. Mid. Amer. and W. Ind.* (*Field Mus. Zool. Pub.* vol. iv) p. 70, 1904, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 45, 1907, emendation of *Odocoileus*, as is also *Odocœlus*.

Lateral metacarpals with only lower ends persisting; vomer high and dividing aperture of posterior nostrils into two chambers; antlers large, with the beam rising at a marked angle to plane of face, and (when fully developed) dichotomously forked, with a sub-basal snag, and the lower, or front, prong of main fork projected from anterior edge of beam and more or less developed at the expense of the upper, or hind one, and more or less secondary forking of one or both prongs; face long and narrow; muzzle with a large naked area; ears variable; tail long or moderate, hairy below; coat uniformly coloured; young spotted; tarsal and usually metatarsal glands present, the latter variable in form and position; gland-pits and face-glands very small; main hoofs well developed; hind-pasterns with a pocket-like gland, which may also be developed in fore-feet; upper canines wanting; naviculo-cuboid of tarsus free from cuneiform. Size medium or small.

The deer included in the present genus are members of a large exclusively American group, the classification of which has given rise to much diversity of opinion; some writers, like Brooke, inclining to include the whole group,

with the exception of the pudus, in a single genus, while others, like Gray, adopt several generic divisions. The former course has hitherto been followed by the present writer, but now that *Hippocamelus* is generally adopted for the guemals, this involves the use of that highly objectionable term, as being the earliest, for the whole group, a course he is not prepared to follow. Under these circumstances, the group is split up into six genera.

The range of the present genus,* which is typified by an upper premolar tooth from a cavern-deposit described as *O. spelæus*, extends from Alaska to Peru, Bolivia, and northern Brazil.

The species here recognised are distinguishable as follows :—

A. Metatarsal gland (when present) small and circular; tail long; ears moderate ..... *O. virginianus.*

B. Metatarsal gland elongated; tail shorter; ears very large.

*a*. Metatarsal gland very long; tail small, black at tip all round ..... ..... *O. hemionus.*

*b*. Metatarsal gland shorter; tail larger, black above, white below ..... *O. columbianus.*

## I. ODOCOILEUS VIRGINIANUS.

"Cervus dama americanus," *Erxleben, Syst. Regn. Anim.* p. 312, 1777; not a technical name, *teste Allen, Amer. Nat.* vol. xxxiv, p. 318, 1900, *Osgood, Proc. Biol. Soc. Washington*, vol. xv, p. 87, 1902, and *Field Mus. Zool. Pub.* vol. x, p. 43, 1912, and *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 585, 1913.

Cervus virginianus, *Boddaert, Elenchus Anim.* vol. i, p. 136, 1785; *Baird, Mamm. N. America*, p. 649, 1857; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 127, 1827; *Caton, Antelope and Deer of America*, p. 100, 1877.

Cervus clavatus, *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 132, 1827; *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 183, 1846.

Cervus (Mazama) virginianus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 315, 1827.

Cervus (Mazama) clavatus, *H. Smith, loc. cit.* 1827.

Odocoileus spelæus, *Rafinesque, Atlantic Journ.* vol. 1, p. 109, 1832.

Dorcelaphus virginianus, *Gloger, Handbuch Naturgesch.* p. 140, 1841.

Mazama virginiana, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 176, 1835.

* As the name *Odocoileus* is etymologically bad, emendations have been proposed, and objections raised to its use in every form.

Cariacus virginianus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; *Gray, List Mamm. Brit. Mus.* p. 175, 1843, *Proc. Zool. Soc.* 1850, p. 238, *Cat. Ungulata Brit. Mus.* p. 228, 1852, *Cat. Ruminants Brit. Mus.* p. 83, 1872, *Hand-List Ruminants Brit. Mus.* p. 83, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 266, 1862; *Garrod, Proc. Zool. Soc.* 1877, p. 18; *Brooke, Proc. Zool. Soc.* 1878, p. 919; *Alston, Biol. Centr. Amer., Mamm.* p. 115, 1879; *Sclater, List Anim. Zool. Gardens*, p. 172, 1883; *Merriam, Mammals of Adirondacks*, p. 107, 1884; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p, 322, 1884; *True, Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1885; *Flower and Lydekker, Study of Mammals*, p. 329, 1891; *Lydekker, Horns and Hoofs*, p. 346, 1893; *Ward, Records of Big Game*, ed. 2, p. 55, 1896.

Reduncina virginiana, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 357, 1873, vol. lxxviii, pt. 1, p. 313, 1879.

Cervus (Cariacus) virginianus, *Herrick, Mamm. Minnesota*, p. 281, 1892.

Cariacus americanus, *Bangs, Proc. Biol. Soc. Washington*, vol. x, p. 25, 1896.

Dorcelaphus americanus, *Rhoads, Proc. Ac. Sci. Philad.* 1897, p. 208; *Pocock, Proc. Zool. Soc.* 1910, p. 962.

Mazama americana, *Lydekker, Deer of All Lands*, p. 249, pl. xx, 1898.

Odocoileus americanus, *Miller, Bull. N. York State Mus.* vol. vi, p. 299, 1899, *List N. Amer. Mamm.* p. 386, 1912; *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 39, 1901; *Pocock, Proc. Zool. Soc.* 1913, p. 783.

Mazama (Dorcelaphus) americana, *Lydekker, Great and Small Game of Europe, etc.* p. 339, 1901; *Ward, Records of Big Game*, ed. 6, p. 103, 1910.

Odocoileus virginianus, *Stone and Cram, American Animals*, p. 34, 1903; *Scharff, Origin of Life in America*, p. 108, 1911; *Cary, N. Amer. Fauna*, no. 33, p. 55, 1911.

Odontocœlus americanus, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 70, 1904, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 46, 1907.

Mazama (Odocoileus) virginianus. *Lydekker, Ward's Records of Big Game*, ed. 7, p. 101, 1914.

White-tailed, or Virginian, Deer.

Typical locality Virginia.

Build light and graceful, with long body and limbs; height variable, ranging from about 3 feet 1 inch to 26 inches at the shoulder; antlers with a long sub-basal snag, above which the beam abruptly curves forwards, and soon after forks dichotomously, posterior prong of main fork upright and generally undivided, anterior, or lower, prong again forking, with its lower division also forked, the whole antler in advance of the sub-basal tine having the appearance of a horizontal beam with three nearly vertical tines arising

from the upper surface; ears relatively small and sparsely haired externally; tail long and pointed; muzzle long and slender; face-glands very small, and almost hidden by folds of skin; metatarsal gland, when present, small, sub-circular,

Fig. 29.—Head of White-tailed Deer (*Odocoileus virginianus*).
From a photograph lent by Mr. E. S. Cameron.

and usually situated in lower third of shank, its centre bare and black, surrounded by a marginal fringe of white hairs, followed by an outer ring of fawn; tarsal gland variable; both fore- and hind-pasterns with a pouch-like gland; general colour in summer varying from bright rufous chestnut to yellowish fawn or grey, in winter some shade

of yellowish leaden grey, faintly speckled, and often with a tinge of rufous; under-parts, inner sides of limbs and buttocks, lower surface of tail, chin, throat, lips, a ring round each eye, and a band round muzzle white; young fully spotted. The case of the numerous forms allied to the true white-tailed deer is very similar to that of the sambar group, so that there is an equal difficulty in deciding whether they should be regarded as species or subspecies; Brooke was inclined to take the latter view, which is adopted by Pocock. In this extended sense the range of the species will reach from Ontario to Central and South America, with a gradual diminution in the size of the local races from north to south.

The following is a provisional "key" to the best-known of these races:—

A. Size large; antlers large and complex.
  *a*. Skull of moderate length and slenderness.
    *a'*. Black on jaw and tail.
      *a''*. Size smaller, colour bright rufous..... *O. v. virginianus.*
      *b''*. Size larger, colour grey..... *O. v. borealis.*
    *b'*. No black on face and tail.
      *b''*. General colour (including tail) reddish brown..... *O. v. macrourus.*
      *c''*. Closely allied to last..... *O. v. leucurus.*
  *b*. Skull larger and more slender, with longer row of cheek-teeth..... *O. v. louisianæ.*

B. Size small, antlers miniatures of those of typical race.
  *a*. Colour (at all seasons) mingled dark and pale brown, tail dark reddish brown tipped with cinnamon..... *O. v. osceola.*
  *b*. Colour pale reddish brown, tail black..... *O. v. texanus.*
  *c*. Colour dull fawn, tail reddish brown..... *O. v. couesi.*
  *d*. Colour greyish brown, tail grizzled white and brown..... *O. v. baileyi.*
  *e*. Colour speckled foxy red, tail foxy red..... *O. v. mexicanus.*
  *f*. Colour brown, with fawn tips to hairs, tail fawn with black tip..... *O. v. rothschildi* and *O. v. chiriquensis.*

C. Size small, antlers slightly lyrate with straight beam.
  *a*. Metatarsal gland present.
    *a'*. Colour bright chestnut, tail tawny..... *O. v. truei.*
    *b'*. Colour mixed black and buff, tail cinnamon *O. v. costaricensis.*
    *c'*. Colour yellowish brown and grey, tail dusky..... *O. v. nemoralis.*

*b*. Metatarsal gland generally wanting.
  *b'*. Colour chestnut-brown, tail brown ..... *O. v. toltecus* and *O. v. acapulcensis*.
  *c'*. Colour buffish grey, coat coarse, ears hairy *O. v. lasiotis*.
  *d'*. Colour yellowish brown, coat fine, ears sparsely haired, size larger ..... *O. v. gymnotis* and *O. v. columbicus*.
  *e'*. Generally similar to last, but colour speckled grey and size smaller ..... *O. v. margaritæ*.
  *f'*. Also nearly allied, but colour dark greyish brown, and tarsal tuft rufous instead of like the leg ..... *O. v. peruvianus*.
D. Antlers inclined backwards in plane of face, with the tips curving inwards and forwards and a similarly directed spur from inner side of each burr; colour bright fulvous ..... *O. v. thomasi*.
E. Antlers small subcylindrical spikes.
  *a*. Size smaller, colour brownish grey, darker on head and dorsal line, tail fulvous ..... *O. v. nelsoni*.
  *b*. Size larger, colour yellowish grey-brown, tail bright rufous ..... *O. v. sinaloæ*.

## A.—Odocoileus virginianus virginianus.

Mazama americana typica, *Lydekker*, *Deer of All Lands*, p. 252, 1898; *Ward*, *Records of Big Game*, ed. 6. p. 103, 1910.

Odocoileus americanus americanus, *Miller*, *List N. Amer. Mamm.* p. 386, 1912.

Typical locality Virginia.

Size large, the height at the shoulder reaching to about 3 feet 1 inch; antlers large; general colour in summer bright rufous chestnut, with black markings on face and tail; in winter speckled yellowish grey; a transverse black band on the chin; tail chestnut or grey above, white beneath, with more or less black at the tip on the upper surface; metatarsal gland well developed, and situated low down on the shank; tarsal tuft large and mingled black and white. Fine antlers attain a length of from 23 to 29 inches.

The range extends through eastern North America from the southern United States northward of Florida and Louisiana.

The reference of some of the following specimens—especially in cases where the place of origin is unknown—to this race is provisional.

47. 12. 28. 25. Skin, mounted. North America.
*Purchased* (*Bartlett*), 1847.

50. 11. 30. 2. Skin, mounted. North America.
*Purchased (Zoological Society)*, 1850.

51. 7. 9. 4. Skin, young female, mounted. Probably from an animal born in London. *Same history*, 1851.

53. 8. 29. 46. Skin, immature female. North America.
*Same history*, 1853.

681, *c*. Skeleton and antlers, mounted. Wisconsin.
*No history.*

50. 11. 22. 25 (681, *q*). Skeleton, immature.
*Purchased (Zoological Society)*, 1850.

59. 9. 28. 5–6 (681, *w*, *x*). Two skulls, with antlers. North America. *Purchased (Cuming)*, 1859.

681, *m*. Skull, with antlers. *No history.*

74. 10. 6. 1. Frontlet and antlers. Fulton County, Ohio; collected by Mr. Sleight. *Purchased*, 1874.

681. *a*. Frontlet and antlers, immature. North America.
*No history.*

681, *b–d*. Three frontlets, with antlers. *No history.*

681, $a^1$. Frontlet and antlers. North America.
*No history.*

681, *n*, *o*, *p*, *q*. Four frontlets, with antlers. North America. *No history.*

681, *f*, *g*. Two single antlers. North America.
*No history.*

## B.—Odocoileus virginianus borealis.

Odocoileus americanus borealis, *Miller, Bull. N. York State Mus.* vol. viii, p. 83, 1900, *List N. Amer. Mamm.* p. 386, 1912.

Odocoileus virginianus borealis, *Stone and Cram, American Animals*, p. 39, 1903.

Mazama americana borealis, *Ward, Records of Big Game*, ed. 6, p. 104, 1910.

Mazama virginiana borealis, *Lydekker, Ward's Records of Big Game*, ed. 7, p. 102, 1914.

Typical locality Hancock County, Maine.

Type in New York State Museum.

Rather larger and greyer than the typical race.

The range extends from the New England States and Canada to northern New York.

45. 7. 4. 5. Skull and antlers. Hudson Bay.
*Presented by the Hudson Bay Co.*, 1845.

45. 7. 4. 6. Skull, immature female. Same locality.
*Same history.*

2. * * *. Skin, mounted. Canada.
*Presented by the Agricultural Department of Canada*, 1902.

2. † † †. Head, female, mounted. Canada.
*Same history.*

## C.—Odocoileus virginianus macrourus.

Cervus* macrourus, *Rafinesque, Amer. Month. Mag.* vol. i, p. 436, 1817; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 134, 1827.

Cervus (Mazama) macrourus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 316, 1827.

Dorcelaphus macrurus, *Gloger, Handbuch Naturgeschichte*, p. 40, 1841.

Dorcelaphus virginianus macrourus, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. vii, p. 257.

Mazama americana macrura, *Lydekker, Deer of All Lands*, p. 257, 1898, *Great and Small Game of Europe, etc.* p. 343, 1901.

Odocoileus americanus macrourus, *Miller and Rehn, Proc. Boston Nat. Hist. Soc.* vol. xxx, p. 14, 1901; *Elliot, Synop. Mamm. N. America* (*Field Mus. Zool. Pub.* vol. ii), p. 39, 1902; *Miller, List N. Amer. Mamm.* p. 386, 1912.

Odocoileus virginianus macrourus, *Stone and Cram, American Animals*, p. 39, 1903.

Odontocœlus americanus macrourus, *Elliot, Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 44, 1905.

Typical locality Plains of Kansas Valley, Upper Mississippi.

Smaller than typical race, and slightly different in colour, with no black on face and tail; antlers rather small and much bowed; general colour in summer reddish brown, in winter bright greyish fawn with black speckling; tail fawn-colour, passing into rusty brown, above; tarsal gland yellowish brown.

The range includes Kansas, Nebraska, the Dakotas, etc.

No specimen in collection.

* Misprinted *Corvus*.

## D.—Odocoileus virginianus leucurus.

Cervus leucurus, *Douglas, Zool. Journ.* vol. iv, p. 330, 1829; *Baird. Mamm. N. America*, p. 649, 1857.

Cariacus leucurus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; *Gray, Cat. Ungulata Brit. Mus.* p. 230, 1852; *Cat. Ruminants Brit. Mus.* p. 83, 1872, *Hand-List Ruminants Brit. Mus.* p. 155, 1873; *Brooke, Proc. Zool. Soc.* 1878, p. 919; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 323, 1884.

Cervus (Mazama) leucurus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 181, 1846.

Reduncina leucura, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 357, 1873, vol. lxxviii, pt. 1, p. 323, 1879.

Odocoileus leucurus, *Seton-Thompson, Forest and Stream*, vol. li, p. 286, 1898; *Stone and Cram, American Animals*, p. 33, 1903; *Miller, List N. Amer. Mamm.* p. 388, 1912.

Typical locality Lower Columbia Valley, Oregon.

Closely allied to the last, from which it was regarded as inseparable both by Caton and Elliot.

The range extends from Washington to California.

53. 8. 29. 52. Skin, mounted. Rocky Mountains, from an animal presented to the Zoological Society by the Earl of Derby. *Purchased (Zoological Society)*, 1853.

## E.—Odocoileus virginianus louisianæ.

Odocœlus virginianus louisianæ, *Allen, Amer. Nat.* vol. xxxv, p. 449, 1901.

Odocoileus louisianæ, *Stone and Cram, American Animals*, p. 39, 1903.

Odontocœlus americanus louisianæ, *Elliot, Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 44, 1905.

Odocoileus americanus louisianæ, *Miller, List N. Amer. Mamm.* p. 386, 1912.

Typical locality Mer Rouge, Louisiana, to which State this race is restricted.

Size relatively large and colour pale in winter, with tall and heavy antlers, a long and slender skull, and a long row of lower cheek-teeth.

No specimen in collection.

## F.—Odocoileus virginianus osceola.

Cariacus osceola, *Bangs, Proc. Biol. Soc. Washington*, vol. x, p. 26, 1896.

Mazama americana osceola, *Lydekker, Deer of All Lands*, p. 259, 1898, *Great and Small Game of Europe, etc.* p. 345, 1901.

Odocoileus osceola, *Miller and Rehn, Proc. Boston Nat. Hist. Soc.* vol. xxx, p. 17, 1901; *Stone and Cram, American Animals*, p. 39, 1903; *Miller, List N. Amer. Mamm.* p. 389, 1911.

Odocoileus americanus osceola, *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 40, 1902.

Odontocœlus americanus osceola, *Elliot, Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 44, 1905.

Typical locality Citrus County, Florida.

About one-third smaller than typical race, and much darker, general colour mixed dark and pale brown; with little or no difference in colour between winter and summer coats, both of which are short and fine; tail dark reddish brown tipped with cinnamon; cheek-teeth relatively large, and certain differences in nasals and maxillæ from those of typical species.

The range appears to be restricted to the Floridan Peninsula.

No specimen in collection.

## G.—Odocoileus virginianus texanus.

Dorcelaphus texanus, *Mearns, Proc. Biol. Soc. Washington*, vol. xii, p. 23, 1898.

Odocoileus texanus, *Seton-Thompson, Forest and Stream*, vol. li, p. 286, 1898; *Miller, List N. Amer. Mamm.* p. 389, 1912.

Odocoileus texensis, *Miller and Rehn, Proc. Boston Nat. Hist. Soc.* vol. xxx, p. 17, 1901; *Elliot, Synop. Mamm. N. Amer.* (*Field. Mus. Zool. Pub.* vol. ii) p. 40, 1902; *Stone and Cram, American Animals*, p. 39, 1903.

Mazama americana texana, *Lydekker, Great and Small Game of Europe, etc.* p. 346, 1901.

Odontocœlus americanus texensis, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field. Mus. Zool. Pub.* vol. iv, p. 70, 1904), *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 45, 1905, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 47, 1907.

Typical locality Fort Clark, Tinney County, Texas.

Type in U.S. National Museum, Washington.

Size small; antlers small, strongly incurved and of the same character as those of typical race; general colour pale reddish, with margins and tips of the short ears and upper side of tail black; cheek-teeth relatively large. In winter top of head black and sides grey, a black dorsal stripe, and general colour mingled yellowish white and grey, becoming dusky on chest.

No specimen in collection.

## H.—Odocoileus virginianus couesi.

Cariacus virginianus, *var.* couesi, *Coues and Yarrow, Rep. Geogr. and Geol. W. of 100th Merid.* vol. v, p. 72, 1875.

Dorcelaphus couesi, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. vii, p. 200, 1895.

Odocoileus couesi, *Seton-Thompson, Forest and Stream*, vol. li, p. 286, 1898; *Stone and Cram, American Animals*, p. 39, 1903; *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 40, 1901; *Miller, List N. Amer. Mamm.* p. 387, 1912.

Mazama americana couesi, *Lydekker, Great and Small Game of Europe, etc.* p. 346, 1901.

Odontocœlus americanus couesi, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 70, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 45, 1905.

Typical locality Crittendan Camp, Pima County, Arizona.

A small desert-form, with antlers like those of typical race; general colour in summer dull fawn, with a tinge of ochre, passing into mouse-grey on back, and tawny or reddish brown on flanks and upper side of tail.

The range includes Arizona and the Sonoran district of Mexico, extending as far south as the Gila Valley and the forest-tracts near Mexico City.

No specimen in collection.

## I.—Odocoileus virginianus battyi.

Odocoileus battyi, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xix, p. 591, 1903; *Miller, List N. Amer. Mamm.* p. 387, 1912.

Odontocœlus battyi, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 71, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 45, 1905.

Typical locality Rancho Santuario, State of Durango, Mexico.

Type in American Museum of Natural History, New York.

Generally similar to *O. v. couesi*, but with antlers bent more sharply outwards, and, in skull, lachrymal vacuities smaller, nasals wider and less arched, basisphenoid more wedgelike, and cheek-teeth larger; general colour grey brown; tail grizzled white and brown.

No specimen in collection.

## J.—Odocoileus virginianus mexicanus.

Cervus mexicanus,* *Lichtenstein, Darstellung. Thiere*, pl. xviii, 1827–34, *ex* Pennant's Mexican Deer.

Cariacus mexicanus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; *Gray, Cat. Ruminants Brit. Mus.* p. 84, 1872, *Hand-List Ruminants Brit. Mus.* p. 156, 1873; *Brooke, Proc. Zool. Soc.* 1878, p. 919; *Alston, Biol. Centr.-Amer., Mamm.* pp. 82 and 113, 1879; *Sclater, List Anim. Zool. Gardens*, p. 173, 1883; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 323, 1884; *Ward, Records of Big Game*, ed. 2, p. 58, 1896, partim.

Reduncina mexicana, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 357, 1873, vol. lxxviii, pt. 1, p. 328, 1879.

Cariacus virginianus mexicanus, *Rhoads, Amer. Nat.* vol. xxviii, p. 524, 1894.

Mazama americana mexicana, *Lydekker, Deer of All Lands*, p. 261, 1898, *Great and Small Game of Europe, etc.* p. 347, 1901.

Dama lichtensteini, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 20, 1902.

Odocoileus mexicanus, *Osgood, Proc. Biol. Soc. Washington*, vol. xv, p. 87, 1902; *Miller, List N. Amer. Mamm.* p. 389, 1912.

Odontocœlus lichtensteini, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 72, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 45, 1905.

Mazama americana lichtensteini, *Ward, Records of Big Game*, ed. 6, p. 105, 1910.

Mazama virginiana lichtensteini, *Lydekker, Ward's Records of Big Game*, ed. 7, p. 103, 1914.

Typical locality Valley of Mexico.

Size small (shoulder-height about 33 inches); antlers resembling those of typical race, but smaller; general colour in summer speckled foxy red, passing into speckled grey on head and ears, and into pure foxy red on tail, which is relatively short; chin, lower jaw, and throat (but not muzzle) white, like under-parts; in winter greyish or ashy brown; metatarsal tuft small, brownish bordered with white. Antlers ranging from 11½ to 13½ inches in length have been measured.

The distributional area probably includes a considerable portion of Southern Mexico.

681, *c*. Frontlet and antlers. Figured by Pennant, and

* The use of this name has been regarded by Allen, Elliot, and others, as being barred by "C. mexicanus," Gmelin, 1788; but it is employed both by Osgood and Miller.

also by Hamilton Smith, as Mexican Deer, and therefore the type of *Cervus mexicanus*. *No history.*

58. 6. 2. 17 (1374, *c*). Skull and antlers. Oaxaca, Southern Mexico. *Purchased* (*Sallé*), 1858.

58. 6. 2. 18 (1374, *d*). Frontlet and antlers. Same locality. *Same history.*

1374, *h*, *i*. Two frontlets with antlers. Same locality. *Same history.*

1374, *e*, *f*. Six odd antlers. Same locality. *Same history.*

681, *r*. Frontlet and antlers. Mexico. *Purchased* (*Argent*).

51. 11. 10. 6 (681, $r^1$). Skeleton, provisionally referred to this race. Locality unknown. *Purchased* (*Zoological Society*), 1851.

94. 11. 20. 1. Frontlet and antlers. Cerro Valijo, Jalisco, Southern Mexico; collected by Dr. A. C. Buller. *Purchased*, 1894.

## K.—Odocoileus virginianus sinaloæ.

Odocoileus sinaloæ, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xix, p. 613, 1903; *Miller*, *List N. Amer. Mamm.* p. 389, 1912.

Odontocœlus sinaloæ, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 78, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 47, 1905.

Typical locality Esquinapa, State of Sinaloa, Mexico.

Type in American Museum of Natural History, New York.

Size relatively large; antlers* simple spikes; general colour (season not stated) yellowish grey-brown, with a black band above muzzle, and the sides of latter, spaces above dark band, and orbital rings grey, and chin and throat buffy greyish white; upper side of tail bright rufous.

98. 3. 2. 148–149. Two skulls. Sinaloa; collected by Mr. P. O. Simons. *Purchased*, 1898.

98. 3. 2. 150. Frontlet and antlers. Same locality. *Same history.*

* Not fully adult in type.

## L.—Odocoileus virginianus toltecus.

Cervus toltecus, *Saussure*, *Rev. Mag. Zool.* ser. 2, vol. xii, p. 247, 1860.

Coassus toltecus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 92, 1872.

Cervus yucatensis, *Hays*, *Ann. Lyc. New York*, vol. x, p. 218, 1874.

Cariacus toltecus, *Brooke*, *Proc. Zool. Soc.* 1878, p. 921; *Alston*, *Biol. Centr.-Amer.*, *Mamm.* p. 117, 1879; *True*, *Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1885.

Mazama americana tolteca, *Lydekker*, *Deer of All Lands*, p. 263, 1898, *Great and Small Game of Europe*, *etc.* p. 348, 1901.

Odocoileus toltecus, *Miller and Rehn*, *Proc. Boston Nat. Hist. Soc.* vol. xxx, p. 117, 1901.

Odontocœlus toltecus, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 74, 1904, *Check-List. Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 46, 1905.

Typical locality near Orizaba, State of Vera Cruz, Mexico, whence this race ranges into Mecantan, South-eastern Mexico.

Size very small, about one-third less than that of typical race; tail relatively long; antlers short, upright, nearly straight, and semi-palmate, with little forward projection of the lower prong of the main fork, and the number of tines reduced; metatarsal gland and tuft wanting; general colour, at all seasons, dark chestnut-brown; face blackish; under-parts white; tail, which is truncated at the tip, brown above.

The aborted antlers and absence of metatarsal gland are degraded features, the former being only a degenerate modification of those of *O. v. mexicanus*, while a transition to the loss of the metatarsal gland occurs in the case of *O. v. nelsoni* and *O. v. nemoralis*, in which it is rudimentary.

56. 12. 14. 1–2 (1374, *a–b*). Two frontlets and antlers. Vera Cruz. *Purchased* (*Sallè*), 1856.

## M.—Odocoileus virginianus acapulcensis.

Cervus acapulcensis, *Caton*, *Antelope and Deer of America*, p. 117, 1877.

Odocoileus acapulcensis, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xii, p. 104, 1898; *Miller*, *List N. Amer. Mamm.* p. 386, 1912.

Typical locality Acapulco, State of Guerrero, Mexico.

Closely allied to the preceding race, with which it is identified by Elliot.

No specimen in collection.

## N.—Odocoileus virginianus nelsoni.

Odocoileus nelsoni, *Merriam, Proc. Biol. Soc. Washington*, vol. xii, p. 103, 1898; *Miller, List N. Amer. Mamm.* p. 389, 1912.

Mazama americana nelsoni, *Lydekker, Great and Small Game of Europe, etc.* p. 349, 1901.

Odontocœlus nelsoni, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 75, 1904, *Check-List Mamm. N. Amer. and W. Indies* (*op. cit.* vol. vi), p. 47, 1905.

Typical locality San Cristobal, highlands of the State of Chiapas, Mexico.

Type in U.S. National Museum, Washington.

A medium-sized race, allied to *O. v. toltecus*, but with the antlers* in the form of simple spikes, and a small metatarsal gland half-way up the shank; general colour (probably at all seasons) brownish grey, becoming blackish on top of head and middle line of back, and grizzled grey on ears; tail fulvous above.

No specimen in collection.

## O.—Odocoileus virginianus thomasi.

Odocoileus thomasi, *Merriam, Proc. Biol. Soc. Washington*, vol. xii, p. 102, 1898; *Miller, List N. Amer. Mamm.* p. 390, 1912.

Mazama americana thomasi, *Lydekker, Great and Small Game of Europe, etc.* p. 350, 1901.

Odontocœlus thomasi, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 75, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 47, 1905.

Typical locality Huehuetan, State of Chiapas, Mexico; the range extending into Oaxaca.

Type in U.S. National Museum, Washington.

Size relatively large; antlers sloping backwards in plane of face, with tips curving inwards and forwards, and a small sub-basal snag on inner border; a small metatarsal gland half-way up the shank; general colour bright fulvous, with a grizzled golden tint in winter, when the coat is longer; forehead black or black and fulvous, and chin white, with the usual black lateral patches; tail bright fulvous above. Skull and teeth similar to those of *O. v. truei* (*infra*).

No specimen in collection.

* Not adult in type.

## P.—Odocoileus virginianus truei.

Cariacus clavatus, *True, Proc. U.S. Nat. Mus.* vol. xi, p. 417, 1888; nec Cervus clavatus, *H. Smith*, 1827.

Cariacus truei, *Trouessart, Cat. Mamm.* vol. ii, p. 895, 1898.

Odocoileus truei, *Merriam, Proc. Biol. Soc. Washington*, vol. xii, p. 103, 1898; *Miller, List N. Amer. Mamm.* p. 390, 1912.

Mazama americana truei, *Lydekker, Great and Small Game of Europe, etc.* p. 350, 1901.

Odontocœlus truii, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 73, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 46, 1905.

Typical locality Segovia Valley, Eastern Honduras.

Type in U.S. National Museum, Washington.

Size medium; general appearance and colour very similar to typical race, but antlers in the form of simple spikes directed backwards nearly in the plane of the face; metatarsal gland small; hoofs yellowish at tips; general colour, at least in summer,* bright chestnut, greyer on head than on back, with a white spot on each side of muzzle, followed by a dusky brown band extending to margin of lip, and continued by a spot on border of lower lip; orbital rings whitish; a dusky brown streak from nose to forehead, which is darker than face; ears mostly grey, with a large white spot at base; upper surface of tail tawny like back; under surface of lower jaw and throat white, like under-parts.

58. 6. 18. 5. Skin, referable either to this race or to *O. v. nemoralis*. Honduras.

*Purchased* (*Zoological Society*), 1858.

58. 6. 18. 8. Skin, female, racially identical with the preceding specimen. Honduras. *Same history.*

9. 6. 11. 14. Skull and skin, young female, provisionally referred to this race. Polochic Valley, Guatemala; collected by G. C. Shortridge, Esq.

*Presented by the Zoological Society*, 1909.

* The speckled brownish grey skin regarded by True as showing the winter coat, is stated by Elliot (*op. cit.* 1905) to be in the summer dress.

## Q.—Odocoileus virginianus costaricensis.

Odocoileus costaricensis, *Miller*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 35, 1901, *List N. Amer. Mamm.* p. 386, 1912.

Odontocœlus costaricensis, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 73, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 46, 1905.

Typical locality Talamanca district, Eastern Costa Rica, between coast and Cordilleran foot-hills.

Type in U.S. National Museum, Washington.

Larger and lighter-coloured than *O. v. trucі;* general colour mingled buff and black—owing to annulation of hairs—darkest on top of head, neck, and fore-part of back; ears dark brownish grey, white internally; tail cinnamon above (like limbs), with dusky tip.

65. 5. 18. 36. Skin, female. Costa Rica; collected by O. Salvin, Esq. *Purchased*, 1865.

65. 5. 18. 37. Skin. Same locality and collector. *Same history.*

67. 8. 23. 2 (1374, *g*). Frontlet and antlers. Costa Rica. *Purchased* (*Carmiol*), 1867.

## R.—Odocoileus virginianus nemoralis.

Cervus nemoralis, *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 137, 1827; *Pucheran*, *Arch. Mus. Paris*, vol. vi, p. 336, 1852.

Cervus (Mazama) nemoralis, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 317, 1827.

Mazama nemoralis, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 175, 1835.

Cariacus nemoralis, *Lesson*, *Nouv. Tabl. Règne Anim.*, *Mamm.* p. 173, 1842; *Gray*, *Cat. Ungulata Brit. Mus.* p. 232, 1852; *Matschie*, *Mitt. geogr. Ges. Lübeck*, 1894, p. 130.

Reduncina nemoralis, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 357, 1873, vol. lxxviii, p. 338, 1879.

Mazama americana nemoralis, *Lydekker*, *Deer of All Lands*, p. 264, 1898; *Great and Small Game of Europe, etc.* p. 349, 1901.

Odontocœlus nemoralis, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 74, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 46, 1905.

Typical locality unknown; the range extends from Honduras to Panama.

Generally similar to *O. v. trucі* (height about 28 or 29 inches); metatarsal gland very small (occasionally obsolete), situated about half-way up shank, with scarcely any white

marginal ring; antlers small (about 7½ inches in length), with the beam straight, a small upright sub-basal tine in front, and forked at summits; general colour brownish grey tinged with yellow; forehead and crown blackish; upper lip and patch on lower lip black; sides of muzzle, lower lip, and chin white; orbital rings fawn; tail dusky above; legs ochery.

No specimen in collection definitely referable to this race (see *O. v. truei*, p. 167).

## 8.—Odocoileus virginianus rothschildi.

Dama rothschildi, *Thomas*, *Novit. Zool.* vol. ix, p. 136, 1902.

Odocoileus rothschildi, *Thomas*, *Proc. Biol. Soc. Washington*, vol. xv, p. 198, 1902.

Odontocœlus rothschildi, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 72, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 46, 1905.

Odocoileus rothschildi rothschildi, *Miller*, *List N. Amer. Mamm.* p. 389, 1912.

Typical locality Coiba Island, west coast of Panama.

Size very small; antlers short, with two or three tines; skull slight, with large lachrymal vacuities; metatarsal gland wanting; general colour brown, with fawn tips to hairs, and dorsal line darker; a spot on each side of muzzle and others above and below each eye whitish; chin, throat, and inner sides of upper part of legs white; tarsal gland reddish brown; tail fawn above with black terminal portion.

2. 3. 5. 24. Skull, with rudiments of antlers, and skin, immature. Coiba Island; collected by Mr. J. H. Batty. *Presented by the Hon. Walter Rothschild*, 1902.

2. 3. 5. 25. Skull, with antlers, and skin. Same locality and collector. *Same history.*

2. 3. 5. 26. Skull, with antlers, and skin. Same locality and collector. Type. *Same history.*

2. 3. 5. 7. Skull and skin in spotted coat, female. Same locality and collector. *Same history.*

2. 3. 5. 8. A similar specimen. Same locality and collector. *Same history.*

2. 3. 5. 9. Skull and skin, female. Same locality and collector. *Same history.*

### T.—Odocoileus virginianus chiriquensis.

Odocoileus rothschildi chiriquensis, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xxviii, p. 96, 1910; *Miller*, *List N. Amer. Mamm.* p. 389, 1912.

Typical locality Chiriqui, Panama.

The continental representative of the preceding race.

No specimen in collection.

### U.—Odocoileus virginianus columbicus.

Cervus, *sp. Pucheran*, *Arch. Mus. Paris*, vol. vi, p. 335, pl. xxiii, fig. 1, 1852.

Cervus columbicus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxxix, pt. 1, p. 66, 1879.

Odocoileus columbicus, *Osgood*, *Field Mus. Zool. Pub.* vol. x, p. 139, 1914.

Type in Paris Museum.

Typified by a skull and antlers, stated to be from Bogota, Colombia, but which, according to Osgood, not improbably came from the savannas of the Orinoco. The antlers appear to be unlike those of *O. v. gymnotis*, with which this form has been identified. The undermentioned specimen has well-haired ears, externally blackish, like the face, no metatarsal gland, and short rufous brown coat.

9. 7. 17. 39. Skull and skin, female. La Maria, Dagua Valley, Western Colombia. Provisionally referred to this race. *Purchased* (*Rosenberg*), 1909.

### V.—Odocoileus virginianus lasiotis.

Odocoileus lasiotis, *Osgood*, *Field Mus. Zool. Pub.* vol. x, p. 136, 1914.

Typical locality Paramo de los Conejos, Sierra de Merida, Venezuela.

Type in Field Museum, Chicago.

A medium-sized mountain-race, with long, dense coat of a general buffish grey colour, variegated by blackish brown markings, the individual hairs having subterminal buffish rings and dusky tips, thickly haired and comparatively short ears, broad, heavy tail, and short, wide hoofs; metatarsal gland wanting.

10. 12. 3. 6. Skull, with antlers, and skin. Merida, Venezuela; collected by Mr. S. Briceño.

*Presented by S. V. Dalton, Esq.*, 1910.

10. 12. 3. 7. Skull and skin, female. Same locality and collector. *Same history.*

## W.—Odocoileus virginianus gymnotis.

Cervus gymnotis, *Wiegmann, Isis*, 1833, p. 965; *Goeldi, Mem. Mus. Goeldi*, pt. iii, p. 32, 1902.

Cervus goudotii, *Gay and Gervais, Ann. Sci. Nat., Zool.* ser. 3, vol. v, p. 94, 1846; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxix, pt. 1, p. 67, 1879.

Cariacus gymnotus, *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 267, 1862, partim.

Cariacus gymnotis, *Brooke, Proc. Zool. Soc.* 1878, p. 921; *Sclater, List Anim. Zool. Gardens*, p. 173, 1883; *Lydekker, Horns and Hoofs*, p. 341, 1893; *Matschie, Mitt. geogr. Ges. Lübeck*, 1894, p. 130.

Gymnotis wiegmanni, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxviii, pt. 1, p. 344, 1879.

Mazama americana gymnotis, *Lydekker, Deer of All Lands*, p. 265, 1898, *Great and Small Game of Europe, etc.* p. 351, 1901.

Odocoileus gymnotis, *Osgood, Field Mus. Zool. Pub.* vol. x, p. 24, 1910, p. 138, 1914.

Typical locality the Savanna area of the lower Orinoco, Venezuela (*teste* Osgood, on whose authority the synonomy of this and the next race is given).

Type in Berlin Museum.

A short-haired lowland-race, with broad, sparsely haired ears, long narrow hoofs, and no metatarsal gland; general colour, at all seasons, yellowish brown speckled with grey, the individual hairs being grey at the base, then brown and ochery, with black tips; a dark streak from the crown of the head along the neck; a greyish white ring round eye; yellowish white and brown spots on forehead, a darker spot on nose, and a patch on upper lip, followed by a white streak reaching angle of mouth; chin white, with a dark streak extending to lower lip, and thence to angle of mouth; tail pale reddish brown above. The antlers of the type measure just short of 7 inches.

According to Goeldi, this race has of late years immigrated into Brazil.

8. 3. 7. 53. Skull and skin, female Coast district, Demerara, British Guiana.

*Presented by F. V. McConnell, Esq.*, 1908.

8. 3. 7. 54. Skull and skin of a rather larger and older female. Same locality. *Same history.*

## X.—Odocoileus virginianus margaritæ.

Odocoileus margaritæ, *Osgood, Field Mus. Zool. Pub.* vol. x, p. 24, 1910, pls. ii and iii.

Typical (and only) locality Margarita Island, Venezuela.

Type in Field Museum, Chicago.

An insular representative of *O. v. gymnotis* distinguished by its smaller size, and the proportionately small skull and teeth, the former of which is characterised by the abruptly elevated brain-case.

No specimen in collection.

## Y.—Odocoileus virginianus spinosus.

Cervus spinosus, *Gay and Gervais, Ann. Sci. Nat., Zool.* ser. 3, vol. v, p. 93, 1846.

Cervus savannarum, *Cabanis and Schomburgk, Reisen Brit. Guiana*, vol. iii, p. 785, 1848.

Cariacus (?) spinosus, *Gray, Cat. Ungulata Brit. Mus.* p. 236, 1852.

Reduncina savannarum, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 358, 1873, vol. lxxviii, p. 242, 1879.

Cariacus savannarum, *Brooke, Proc. Zool. Soc.* 1878, p. 920; *Matschie, Mitt. Geogr. Ges. Lübeck*, 1894, p. 130.

Mazama americana savannarum, *Lydekker, Deer of All Lands*, p. 266, 1898, *Great and Small Game of Europe, etc.* p. 352, 1901.

Mazama spinosa, *Lydekker, Deer of All Lands*, p. 280, 1898.

(?) Dorcelaphus americanus savannarum, *Pocock, Proc. Zool. Soc.* 1910, p. 962.

Odocoileus spinosus, *Osgood, Field Mus. Zool. Pub.* vol. x, p. 138, 1914; *cited as* Cervus spinosus, *but included under the heading* Odocoileus.

Typical locality Cayenne, French Guiana.

Type (a single antler) in Paris Museum.

According to Osgood, the Guianan representative of *O. v. gymnotis*, but generally stated to have well-haired ears and a metatarsal gland,* the general colour being clear greyish

* *Vide* Pocock, *op. cit.*; whether his specimen be rightly identified or no, his recognition that it is merely a race of the whitetail agrees with the views of the present writer.

brown speckled with white, and the lower lip having a single dark spot on each side.

The range probably includes most of Guiana and part of Venezuela.

92. 12. 2. 1–2. Two frontlets, with antlers. North-western British Guiana.

*By exchange with Dr. P. Rendall*, 1892.

10. 5. 4. 60. Skull and skin, immature female. Supinaam Valley, British Guiana.

*Presented by F. V. McConnell, Esq.*, 1910.

10. 5. 4. 61. A similar specimen. Same locality.

*Same history.*

14. 9. 2. 1. Skull and skin, female, provisionally referred to this race. Northern Venezuela; collected by A. Pam, Esq. Noticed by Pocock, *op. cit.*

*Presented by the Zoological Society*, 1914.

## Z.—Odocoileus virginianus peruvianus.

Cervus (Coassus) peruvianus, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. xii, p. 332, 1874.

Cariacus peruvianus, *Brooke, Proc. Zool. Soc.* 1878, p. 920; *Lydekker, Horns and Hoofs*, p. 340, 1893; *Matschie, Mitt. Geogr. Ges. Lübeck*, 1894, p. 129.

(?) Cervus brachyceros, *Philippi, An. Mus. Chile*, 1894, p. 10, pl. ii; nec *Gervais and Ameghino*, 1880.

(?) Cariacus, *sp. Nehring, Sitzber. Ges. Nat. Freunde*, 1895, p. 12.

Mazama americana peruviana, *Lydekker, Deer of All Lands*, p. 267, 1898, *Great and Small Game of Europe, etc.* p. 352, 1901.

(?) Mazama (Dorcelaphus), *sp. Lydekker, Deer of All Lands*, p. 281, 1898.

Odocoileus peruvianus, *Trouessart, Cat. Mamm., Suppl.* p. 706, 1904; *Auerbach, Zool. Anz.* vol. xxxix, p. 310, 1912; *Goeldi, Mitt. Nat. Ges. Bern*, 1912, p. 12; *Osgood, Field Mus. Zool. Pub.* vol. x, p. 152, 1914.

(?) Odocoileus philippii, *Trouessart, Cat. Mamm., Suppl.* p. 706, 1904; *Goeldi, Mitt. Nat. Ges. Bern.* 1912, p. 14.

Typical locality Peru.

Another nearly related small race without the metatarsal gland; general colour dark greyish brown, with whitish speckling, the individual hairs dark isabelline grey at base and ringed with white below the black tips; chin and lower lip white, with a brown patch on former; tarsal tuft small, short, and deep rusty red in colour.

The range includes Bolivia, and, if *O. philippii* be a synonym, the Andes of the Cajamarca district of Chile.

58. 5. 4. 21 (1375, *a*). Skull and antlers. Peru (?).
*Purchased* (*Zoological Society*), 1858.

73. 6. 27. 3 (1375, *b*). Skull, female. Peru.
*Purchased* (*Whitely*), 1873

74. 3. 27. 2 (1375, *c*). Skin, immature female, mounted, and skull. Ceachupati, Peru. Co-type.
*Purchased* (*Whitely*), 1874.

85. 4. 22. 2. Skin, immature female. Same locality; from collection of Sir Victor Brooke, Bart. Co-type.
*Purchased* (*Whitely*), 1885.

94. 11. 20. 2. Skull, with antlers, and skin. Maraynioc, Peru; collected by Mr. J. Kalinowski. *Purchased*, 1894.

94. 11. 20. 3. A similar specimen. Same locality and collector. *Same history.*

0. 3. 1. 100. Skull and skin; immature female. Yataujual, Cajamarca, Peru; collected by Mr. P. O. Simons.
*Presented by O. Thomas, Esq.*, 1900.

## II. ODOCOILEUS HEMIONUS.

Cervus hemionus, *Rafinesque, Amer. Month. Mag.* vol. i, p. 436, 1817.

Cervus auritus, *Ward, Descrip. Etatsunis*, vol. v, p. 540, 1820; *Desmarest, Mammalogie*, vol. ii, p. 443, 1822.

Cervus macrotis, *Say, Long's Exped. Rocky Mountains*, vol. ii, p. 83, 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 133, 1827; *Caton, Antelope and Deer of America*, p. 93, 1877.

Cervus (Mazama) macrotis, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 316, 1827.

Mazama macrotis, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 175, 1835.

Dorcelaphus macrotis, *Gloger, Handbuch Naturgeschichte*, p. 140, 1841.

Cariacus macrotis, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; *Gray, Proc. Zool. Soc.* 1850, p. 239, *Cat. Ungulata Brit. Mus.* p. 234, 1852; *Brooke, Proc. Zool. Soc.* 1878, p. 921; *Alston, Biol. Centr. Amer., Mamm.* p. 114, 1879; *Sclater, List Anim. Zool. Gardens*, p. 173, 1883; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 324, 1884; *True, Proc. U.S. Nat. Mus.* vol. vii, p. 502, 1885; *Flower and Lydekker, Study of Mammals*, p. 329, 1891; *Lydekker, Horns and Hoofs*, p. 342, 1893; *Ward, Records of Big Game*, ed. 2, p. 60, 1896.

Eucervus macrotis, *Gray, Ann. Mag. Nat. Hist.* ser. 3, vol. xviii, p. 339, 1866, *Cat. Ruminants Brit. Mus.* p. 86, 1872, *Hand-List Ruminants Brit. Mus.* p. 157, 1873.

Otelaphus macrotis, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 356, 1873, vol. lxxviii, pt. 1, p. 303, 1879.

Dorcelaphus hemionus, *Allen*, *Bull. Amer. Mus.* vol. vii, p. 257, 1895.

Odocoileus hemionus, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xii, p. 100, 1897; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 40, 1901; *Stone and Cram*, *American Animals*, p. 39, 1903; *Pocock*, *Proc. Zool. Soc.* 1912, p. 783; *Scharff*, *Origin of Life in America*, p. 107, 1911; *Cary*, *N. Amer. Fauna*, no. 33, p. 56, 1911; *Miller*, *List N. Amer. Mamm.* p. 388, 1912.

Mazama hemionus, *Lydekker*, *Deer of All Lands*, p. 269, pl. xxi, 1898.

Mazama (Dorcelaphus) hemionus, *Lydekker*, *Great and Small Game of Europe, etc.* p. 354, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 106, 1910, ed. 7, p. 104, 1914.

Odontocœlus hemionus, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 76, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 48, 1905, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 49, 1907.

Eucervus hemionus, *Pocock*, *Proc. Zool. Soc.* 1910, p. 966.

Mule-Deer.

Typical locality Sioux Valley, South Dakota.

Type of *Eucervus*.

Build heavier and coarser than in typical race of *O. virginianus;* size somewhat greater than in latter, the shoulder-height being from about 3 feet to 3 feet 6 inches; antlers with very short sub-basal snag, above which the beam is directed outwards for a short distance and then curves upwards to form a dichotomous fork, of which both prongs are normally nearly equal, and again divide, the normal number of points being five on each side; ears very large and thickly haired; tail moderately long, terminating in a brush-like tuft of hair, naked on under surface at base; muzzle relatively short; face-glands rather large; metatarsal gland and tuft long and straight, occupying whole of one side of upper half of shank, its hair nearly of the same cinnamon tint as that of legs, as is that of tarsal gland; general colour typically reddish or yellowish tawny in summer, dark brownish or rufous grey, speckled with whitish, darkest on withers in winter; forehead usually with a dark brown patch, extending nearly to eyes, and a brown patch on each side of nose, rest of face and throat white; front border of ears black; inner sides of buttocks and legs, abdomen, and most of inner surface of ears white or whitish, rest of under-parts blackish brown; tail short, black at tip, typically

elsewhere white both above and below. On first assumption of winter coat the colour becomes for a short time almost black.

The large hairy ears, elongated metatarsal glands, short, black-tipped tail, with its lower surface naked at base, and the shape of the antlers, form the leading characteristics of this species, the range of which includes the greater part of North America westward of the Missouri River, from Fort George to Texas.

The named races are distinguishable as follows:—

A. Antlers of the fully developed type, normally with 5 points on each size; size large.
  *a*. Colour * tawny or grey, tail white with black tip.
    *a'*. Colour tawny, tail tapering, antlers larger — *O. h. hemionus.*
    *b'*. Colour grey, tail not tapering, antlers smaller — *O. h. virgultus.*
  *b*. Colour pale tawny; tail with dark dorsal line connecting black tip with dark area of back — *O. h. californicus.*
  *c*. Colour fulvous, tail whitish with black tip — *O. h. eremicus.*
  *d*. Colour drab-grey, tail dark at base and white in middle, with black tip — *O. h. canus.*

B. Antlers simpler, with only a single branch from main tine; size rather smaller — *O. h. cerrosensis.*

C. Antlers simple spikes; size smaller — *O. h. peninsulæ.*

## A.—Odocoileus hemionus hemionus.

Cervus macrotis montanus, *Caton*, *Antelope and Deer of America*, ed. 2, p. 94, 1881.

Mazama hemionus typica, *Lydekker*, *Deer of All Lands*, p. 275, 1898.

Odocoileus hemionus hemionus, *Miller*, *List N. Amer. Mamm.* p. 388, 1912.

Typical locality Sioux Valley, South Dakota.

General coloration that of species, of a full dark type; tail without a dark dorsal line.

1619, *a*. Skull and antlers. North America. *No history.*

1619, *b*. Skeleton, mounted. Yellowstone Park, Montana. *Purchased* (*Ward, Rochester, U.S.A.*).

58. 6. 18. 4 (1619, *c*). Skull and antlers. North America. *Purchased* (*Zoological Society*), 1858.

* In summer, both in this and following races.

63. 2. 24. 41. Skin, female, mounted. Fort Colville, British Columbia. *Presented by J. K. Lord, Esq.*, 1863.

72. 12. 12. 3. Skin, mounted. Yellowstone Park. *Purchased* (*Ward, Rochester, U.S.A.*), 1872.

72. 12. 12. 4. Skin, mounted, female. Same locality. *Same history.*

12. 5. 15. 1. Skin, in winter coat, mounted. La Rochelle Creek, British Columbia.

*Presented by the Government of British Columbia*, 1912.

## B.—Odocoileus hemionus virgultus.

Cariacus virgultus, *Hallock*, *Forest and Stream*, vol. lii, p. 404, 1899.

Odocoileus virgultus,* *Miller and Rehn*, *Proc. Boston Nat. Hist. Soc.* vol. xxxi, p. 69, 1903; *Miller*, *List N. Amer. Mamm.* p. 390, 1912.

Odontocœlus hemionus virgultus, *Elliot*, *Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 49, 1905.

Typical locality north-western Minnesota, whence the range extends into the adjoining British territory.

Distinguished from typical race by smaller antlers, and uniform calibre of short tail; general colour dark grey, with long black and white hairs.

No specimen in collection.

## C.—Odocoileus hemionus californicus.

Cervus macrotis, *var.* californicus, *Caton*, *Amer. Nat.* vol. x, p. 464, 1876, vol. xix, p. 811, 1885.

Mazama hemionus californica, *Lydekker*, *Deer of All Lands*, p. 276, 1898, *Great and Small Game of Europe, etc.* p. 350, 1901.

Odocoileus hemionus californicus, *Seton-Thompson*, *Forest and Stream*, vol. li, p. 286, 1898; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 43, 1901; *Stone and Cram*, *American Animals*, p. 41, 1912; *Miller*, *List N. Amer. Mamm.* p. 388, 1912.

Odontocœlus hemionus californicus, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 77, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 49, 1905.

Typical locality Gaviota Pass, Coast Range, forty miles from Santa Barbara, California.

Ears smaller than in typical race; tail with a dark dorsal

* Misprinted *virgultis* in first quotation.

line connecting the black tip with the dark of the back; general colour often brighter.

The range extends south of San Francisco into Lower California.

No specimen in collection.

## D.—Odocoileus hemionus cerrosensis.

Odocoileus cerrosensis, *Merriam, Proc. Biol. Soc. Washington*, vol. xii, p. 101, 1898; *Stone and Cram, American Animals*, p. 41, 1903; *Miller, List N. Amer. Mamm.* p. 387, 1912.

Mazama hemionus cerrosensis, *Lydekker, Great and Small Game of Europe, etc.* p. 359, 1901.

Odontocœlus cerrosensis, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 76, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 47, 1905.

Typical locality Cerros, or Cedros, Island, Lower California.

Considerably smaller than last, with smaller and simpler antlers, which are bowed outwards at first and incurved at tips, with only a single branch projecting upwards and inwards from upper third of main tine of each side; general colour grizzled grey, with a blackish dorsal stripe, and a spot on top of nose and one on each side of nostrils dusky; tail with dark band above, basal two-thirds whitish, and remainder black; row of cheek-teeth short.

No specimen in collection.

## E.—Odocoileus hemionus eremicus.

Dorcelaphus hemionus eremicus, *Mearns, Proc. U.S. Nat. Mus.* vol. xx, p. 470, 1897.

Mazama hemionus eremica, *Lydekker, Deer of All Lands*, p. 277, 1898, *Great and Small Game of Europe, etc.* p. 360, 1901.

Odocoileus hemionus eremicus, *Seton-Thompson, Forest and Stream*, vol. li, p. 286, 1898; *Stone and Cram, American Animals*, p. 41, 1903; *Miller, List N. Amer. Mamm.* p. 388, 1912.

Odontocœlus hemionus eremicus, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 77, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 49, 1905.

Typical locality Sierra Seri, near the Gulf of California, Sonora, Mexico; the range including a portion of Lower California, and at least much of Sonora.

Type in U.S. National Museum, Washington.

A pale desert-race of the species, the general colour being pale drab-grey, with a darker dorsal stripe, which forms a blackish spot at the base of the tail, with a slight extension along the upper surface of the same.

No specimen in collection.

## F.—Odocoileus hemionus peninsulæ.

Mazama hemionus peninsulæ, *Lydekker*, *Proc. Zool. Soc.* 1897, p. 900, *Deer of All Lands*, p. 276, 1898, *Great and Small Game of Europe, etc.* p. 359, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 107, 1910, ed. 7, p. 104, 1914.

Odocoileus hemionus peninsulæ, *Miller and Rehn*, *Proc. Boston Nat. Hist. Soc.* vol. xxx, p. 16, 1901; *Miller*, *List N. Amer. Mamm.* p. 358, 1912.

Odontocœlus hemionus peninsulæ, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 78, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 50, 1905.

Typical locality Sierra Laguna, La Paz, Lower California.

Smaller than and more brightly coloured than *O. h. californicus*, with the antlers in the form of simple spikes and a basal snag; general colour in winter dark speckled iron-grey, with an irregular black band along middle of back, expanding towards hind-quarters, and continued on to upper surface of the tail, where it may be connected by a narrow line with the black tip, or separated by a broad ring of pale straw-coloured hair; legs bright chestnut, and a patch of same colour on flanks, separating the dark speckled grey of the back from the uniform blackish brown of the under-parts.

98. 3. 1. 171. Skin, immature. Sierra Laguna, La Paz; collected by Mr. D. Coolidge. Type. *Purchased*, 1898.

98. 3. 1. 172. A similar specimen. Same locality and collector. *Same history.*

## G.—Odocoileus hemionus canus.

Odocoileus hemionus canus, *Merriam*, *Proc. Washington Acad.* vol. iii, p. 560, 1901; *Miller*, *List N. Amer. Mamm.* p. 388, 1912.

Odontocœlus hemionus canus, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 78, 1904, *Check-List Mamm. N. Amer. etc.* (*op. cit.* vol. vi) p. 50, 1905.

Typical locality Sierra en Media, State of Chihuahua, Mexico.

Smaller and paler than typical race, with lighter and more slender antlers; general colour pale grey; top of head and face pale brown; chin white; breast black; basal half of upper side of tail partially or wholly dark.

No specimen in collection.

## III. ODOCOILEUS COLUMBIANUS.

Cervus macrotis, *var.* columbianus, *Richardson, Fauna Bor.-Amer.* p. 257, 1829.

Cervus lewisii, *Peale, Mamm. U.S. Explor. Exped.* p. 39, 1848.

Cervus richardsonii, *Audubon and Bachman, Quadrupeds N. America*, vol. ii, p. 211, 1853.

Cariacus punctulatus, *Gray, Proc. Zool. Soc.* 1850, p. 239.

Cervus columbianus, *Baird, N. Amer. Mamm.* p. 659, 1857; *Caton, Antelope and Deer of America*, p. 96, 1877.

Eucervus columbianus, *Gray, Ann. Mag. Nat. Hist.* ser. 3, vol. xviii, p. 388, 1866, *Cat. Ruminants Brit. Mus.* p. 86, 1872, *Hand-List Ruminants Brit. Mus.* p. 157, 1873.

Eucervus pusillus, *Gray, Hand-List Ruminants Brit. Mus.* p. 157, 1873.

Otelaphus richardsonii, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 357, 1873, vol. lxxviii, pt. 1, p. 308, 1879.

Reduncina punctulata, *Fitzinger, op. cit.* vol. lxviii, pt. 1, p. 357, 1873.

Cariacus columbianus, *Brooke, Proc. Zool. Soc.* 1878, p. 921; *True, Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1885.

Otelaphus punctulatus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxviii, pt. 1, p. 307, 1879.

Cariacus macrotis columbianus, *Ward, Records of Big Game*, ed. 2, p. 60, 1896.

Dorcelaphus columbianus, *Mearns, Proc. U.S. Nat. Mus.* vol. xx, p. 468, 1897.

Odocoileus columbianus, *Merriam, Proc. Biol. Soc. Washington*, vol. xii, p. 100, 1898; *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 71, 1901; *Stone and Cram, American Animals*, p. 42, 1903; *Scharff, Origin of Life in America*, p. 108, 1911; *Miller, List N. Amer. Mamm.* p. 387, 1912.

Mazama columbiana, *Lydekker, Deer of All Lands*, p. 278, 1898.

Mazama pusilla, *Lydekker, Deer of All Lands*, p. 281, 1898.

Mazama (Dorcelaphus) columbianus, *Lydekker, Great and Small Game of Europe, etc.* p. 360, 1901; *Ward, Records of Big Game*, ed. 6, p. 109, 1910.

Odontocœlus columbianus, *Elliot, Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 48, 1905.

Black-tailed Deer.

Typical locality near mouth of Columbia River, Oregon.

Smaller than the mule-deer, with relatively shorter ears

and finer hair, shorter metatarsal gland, which occupies a considerable portion of upper half of shank, and also by relatively large tail being black above and white below; general colour in winter speckled tawny brownish grey, the individual hairs being dark brown for the greater part of their length, but near the extremities ringed with yellowish brown, and terminating in black tips; hind portion of under-parts and region of base of tail, as well as upper part of throat and chin, white; face grey, darker on forehead; legs dark cinnamon, without admixture of white hairs; tarsal and metatarsal tufts a shade lighter than adjacent portions of legs, no bare portion of gland visible in metatarsal tuft; in summer general colour reddish yellow; face-glands rather small; antlers of the general type of those of mule-deer, but smaller. The distinctive features of this species are the black upper side of the tail and the medium length of the metatarsal gland and tuft, which are situated entirely above the middle of the shank.

The range includes western North America from Alaska and British Columbia, through Washington and Oregon west of the Cascade Mountains, to California as well as the coast-districts of Vancouver Island.

The races are distinguishable as follows:—

A. Colour yellower; tail wholly white below.
  *a*. Ears larger.
    *a'*. Colour deeper ..... *O. c. columbianus.*
    *b'*. Colour paler ..... *O. c. scaphiotus.*
  *b*. Ears smaller ..... *O. c. sitkensis.*
B. Colour redder; tail dark below at tip ..... *O. c. crooki.*

## A.—Odocoileus columbianus columbianus.

Odocoileus columbianus columbianus, *Miller, List N. Amer. Mamm.* p. 387, 1912.

Typical locality near mouth of Columbia River.

General characters those of the species.

45. 7. 4. 3 (681, *i*). Skull and antlers. Valley of Columbia River. *Presented by the Hudson Bay Co.*, 1845.

45. 7. 4. 4 (681, *j*). Skull, female. Same locality.

*Same history.*

68. 2. 13. 2. Young skull. British Columbia (?). Type of *Eucervus pusillus*. *Presented by Dr. R. Brown*, 1868.

71. 4. 8. 1 (681, *k*). Frontlet and antlers. British Columbia (?). *Purchased* (*Blyth*), 1871.

6. 6. 12. 1–2. Head, mounted, and body-skin, female. British Columbia. *Presented by W. K. Thompson, Esq.*, 1906.

## B.—Odocoileus columbianus sitkensis.

Odocoileus columbianus sitkensis, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xii, p. 100, 1898; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 42, 1901; *Stone and Cram*, *American Animals*, p. 43, 1903; *Miller*, *List N. Amer. Mamm.* p. 387, 1912.

Mazama columbiana sitkensis, *Lydekker*, *Great and Small Game of Europe, etc.* p. 361, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 109, 1910, ed. 7, p. 107, 1914.

Odontocœlus columbianus sitkensis, *Elliot*, *Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 48, 1905.

Typical locality Sitka, Alaska.

Type in U.S. National Museum, Washington.

Distinguished from typical race by its inferior size and smaller ears; general colour in summer fulvous; face grizzled grey, with a dusky patch extending from eyes midway to nose; metatarsal tuft bordered with black.

No specimen in collection.

## C.—Odocoileus columbianus scaphiotus.

Odocoileus columbianus scaphiotus, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xii, p. 101, 1898; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 42, 1901; *Stone and Cram*, *American Mammals*, p. 43, 1903; *Miller*, *List N. Amer. Mamm.* p. 387, 1912.

Mazama columbiana scaphiotus, *Lydekker*, *Great and Small Game of Europe, etc.* p. 362, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 109, 1910.

Odontocœlus columbianus scaphiotus, *Elliot*, *Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 48, 1905.

Typical locality Gabilan Range, Riverside County, California.

Type in U.S. National Museum, Washington.

A large-eared and pale-coloured mountain-race.

No specimen in collection.

## D.—Odocoileus columbianus crooki.

Dorcelaphus crooki, *Mearns*, *Proc. U.S. Nat. Mus.* vol. xx, p. 468, 1897.

Odocoileus crooki, *Seton-Thompson*, *Forest and Stream*, vol. li, p. 286, 1898; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 41, 1901; *Stone and Cram*, *American Mammals*, p. 41, 1903; *Miller*, *List N. Amer. Mamm.* p. 387, 1912.

Mazama crooki, *Lydekker*, *Deer of All Lands*, p. 268, 1898.

Mazama columbiana crooki, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 362, 1901.

Odontocœlus crooki, *Elliot*, *Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 47, 1905.

Typical locality Dog Mountains, Grant County, New Mexico.

Type in U.S. National Museum, Washington.

General colour (female) in summer reddish-fawn, darker on back, with the neck greyish drab, flanks greyish cinnamon, and legs creamy; black of upper side of tail extending on to lower side of tip; hairs of metatarsal tuft sooty with white tips.

No specimen in collection.

### Incertæ Sedis.

1. Cervus affinis, *Pucheran*, *C.R. Ac. Sci. Paris*, vol. xxix, p. 777, 1849; *nec* Hodgson, 1841.

Cervus similis, *Pucheran*, *Arch. Mus. Paris*, vol. vi, p. 357, 1852.

Reduncina similis, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. i, p. 357, 1873, vol. lxxviii, pt. i, p. 321, vol. lxxix, pt. i, p. 62, 1879.

Cariacus similis, *Brooke*, *Proc. Zool. Soc.* 1878, p. 920.

Mazama similis, *Lydekker*, *Deer of All Lands*, p. 281, 1898.

Founded on a male specimen in the Paris Museum, of which the exact locality is unknown, but which probably came from the Southern United States. In general coloration this is very similar to the typical race of the white-tailed deer in summer, but the upper half of the tarsal tuft is rusty red, and only the lower half white.

2. Cariacus leptocephalus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 85, 1872, *Hand-List Ruminants Brit. Mus.* p. 157, pl. xxxvii, 1873.

Mazama leptocephala, *Lydekker*, *Deer of All Lands*, p. 281, 1898.

52. 12. 26. 160. Skull and antlers. Locality unknown. Type.

*Transferred from the Zoological Society's Museum*, 1852.

## VIII. Genus BLASTOCERUS.

Blastocerus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 182, 1846; *Gray, Cat. Ungulata Brit. Mus.* p. 223, 1852, *Cat. Ruminants Brit. Mus.* p. 87, 1872; *Brooke, Proc. Zool. Soc.* 1878. p. 922; *Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 49, 1881; *Pocock, Proc. Zool. Soc.* 1910. p. 966.

Blastoceros, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 358, 1873; *Lydekker, Deer of All Lands*, p. 282, 1898.

Paraceros, *Ameghino, Mamm. Foss. Répub. Argent.* p. 605, 1889; *Lydekker, An. Mus. La Plata, Pal. Argent.* vol. ii, p. 80, 1893.

Antifer, *Ameghino, op. cit.* p. 610, 1889; *Lydekker, op. cit.* p. 81, 1893.

Epieuryceros, *Ameghino, op. cit.* p. 613, 1889; *Lydekker, op. cit.* p. 81, 1893.

Ozotoceros, *Ameghino, Rev. Argent. Hist. Nat.* vol. i, p. 243, 1891, to replace *Blastocerus*, Sundevall, supposed to be preoccupied by *Blastocera*, Gerstein, 1856.

Ozelaphus, *Knottnerus-Meyer, Arch. Naturgesch.* vol. lxxiii, p. 98, 1907.

Antlers large and complex, without sub-basal snag, forking in a regularly dichotomous manner, with the upper, or posterior prong more or less exceeding the lower, or anterior, one in size; metatarsal gland and tuft absent; tail short; face moderately long; face-glands well developed, and gland-pits in skull rather large and deep; foot-glands not definitely known; upper canines generally present in adult males; size large or rather small; young uniformly coloured or spotted. The absence of the metatarsal gland and of a sub-basal snag to the regularly dichotomous antlers are the most easily recognised features of this genus, which in most other respects resembles *Odocoileus*, although the nature of the foot-glands and their presence or absence in the fore-limbs does not appear to be definitely known.

The two species are distinguishable as follows:—

A. Size large, antlers complex, hair on withers directed backwards, colour deep rufous..... *B. dichotomus.*

B. Size smaller, antlers simpler, hair on withers directed forwards, colour yellowish-brown ..... *B. bezoarticus.*

### I. BLASTOCERUS DICHOTOMUS.

Cervus dichotomus, *Illiger, Abh. Ak. Sci. Berlin*, 1811, pp. 108 and 117, 1815; separate copies said to have been issued in 1811; based on Azara's guazupuco.

Cervus paludosus, *Desmarest, Mammalogie*, vol. ii, p. 443, 1822; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 134, 1827;

*Burmeister, Descript. Phys. Répub. Argent.* vol. iii, p. 480, 1879; *Goeldi, Mammiferos do Brasil*, p. 106, 1893, *Mem. Mus. Goeldi*, pt. iii, p. 5, 1902.

Cervus palustris, *Desmoulins, Dict. Class. Hist. Nat.* vol. iii, p. 379, 1823.

Cervus (Mazama) paludosus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 316, 1827.

Mazama paludosa, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 173, 1835.

Dorcelaphus paludosus, *Gloger, Handbuch Naturgeschichte*, p. 140, 1841.

Cariacus paludosus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; *Brooke, Proc. Zool. Soc.* 1878, p. 922; *Flower and Lydekker, Study of Mammals*, p. 329, 1891; *Lydekker, Horns and Hoofs*, p. 343, 1893, *An. Mus. La Plata, Pal. Argent.* vol. ii, p. 80, 1893; *Ward, Records of Big Game*, ed. 2, p. 57, 1896.

(?) Mazama furcata, *Gray, List Mamm. Brit. Mus.* p. 176, 1843.

Cervus (Elaphus Blastocerus) paludosus, *Wagner, Schreber's Säugthiere, Suppl.* vol. iv, p. 367, 1844.

Cervus (Blastocerus) paludosus, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 182, 1846; *Ihering, Mammiferos de São Paulo*, p. 14, 1894.

Blastoceros paludosus, *Gray, Proc. Zool. Soc.* 1850, p. 237, *Cat. Ungulata Brit. Mus.* p. 224, 1852, *Cat. Ruminants Brit. Mus.* p. 87, 1872, *Hand-List Ruminants Brit. Mus.* p. 157, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 266, 1862; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 359, 1873, vol. lxxviii, pt. 1, p. 350, 1879.

Cariacus palustris, *Lydekker, Royal Nat. Hist.* vol. ii, p. 387, 1894.

Mazama dichotoma, *Lydekker, Deer of All Lands*, p. 283, 1898.

Mazama (Blastoceros) dichotoma, *Lydekker, Great and Small Game of Europe, etc.* p. 363, 1901; *Ward, Records of Big Game*, ed. 6, p. 110, 1910, ed. 7, p. 108, 1914.

Blastocerus dichotomus, *Pocock, Proc. Zool. Soc.* 1910, p. 966.

Marsh-Deer; Veado Galheiro Grande; Guazupuco.

Type of genus.

Typical locality Brazil.

Largest of South American deer, the size being approximately that of a red deer, but the build more slender; antlers large and rugose, with both prongs of main fork dividing more than once, and upper prong usually larger than lower one; muzzle bluntly pointed; ears large, and filled internally with woolly white hair; tail bushy; coat long and coarse, without radiating whorls on back and neck; general colour in summer bright rufous chestnut, in winter brownish red, becoming lighter on flanks, neck, and chest; legs black from

knees and hocks downwards, and tarsal tuft also black; abdomen, inside of thighs, throat, chin, and insides and bases of backs of ears white or yellowish white; a whitish line above, or a ring round, eyes, most marked in females; a black band on muzzle and upper lip, joining a median dark streak on nose, and black markings on under lip; tail yellowish rusty red above and black beneath; in immature females limbs less black, showing fawn on sides below hocks and knees, in advance of which the extremities are white, and black streak on nose wanting; young not spotted. Fine antlers attain a length of from 21 to 24½ inches.

The range includes suitable localities throughout Brazil, and perhaps part of Guiana, through Paraguay, Entre Rios, and Uruguay to the Chaco, or wooded internal districts of Argentina.

687, *a*. Frontlet and antlers. South America. *No history.*

65. 7. 8. 2 (687, *b*). Frontlet and antlers. South America. *Purchased* (*Bartlett*), 1865.

71. 6. 20. 2 (687, *c*.) Antlers. South America. *Purchased* (*Cutter*), 1871.

72. 11. 4. 1. Frontlet and antlers. South America. *Purchased* (*Gerrard*), 1872.

94. 6. 25. 1. Skull, with antlers. Paraguay; collected by Dr. J. Bohls. *Purchased*, 1894.

98. 10. 11. 1. Skin, mounted. Brazil. *Purchased*, 1898.

6. 10. 18. 1. Head, mounted, with abnormal antlers. Northern Argentina. *Presented by A. F. Vans Agnew, Esq.*, 1906.

11. 10. 27. 4. Skull, with antlers, and skin. Alto Paraguay, Bolivia; collected by Mr. C. H. B. Grant. *Presented by G. W. Tudor, Esq.*, 1911.

## II. BLASTOCERUS BEZOARTICUS.

Cervus bezoarticus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 175, ed. 12, vol. i, p. 67, 1766.

Cervus campestris, *F. Cuvier, Dict. Sci. Nat.* vol. vii, p. 484, 1817; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 136, 1827; *Burmeister, Descript. Phys. Répub. Argent.* vol. iii, p. 463, 1879; *Goeldi, Mammiferos do Brasil*, p. 107, 1893.

Cervus leucogaster, *Schreber, Säugthiere*, vol. v, p. 1127, 1817.

Cervus (Mazama) campestris, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 317, 1827; *Goeldi*, *Mem. Mus. Goeldi*, pt. iii, p. 23, 1902.

Cervus azaræ, *Wiegmann*, *Isis*, 1833, p. 954.

Mazama campestris, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 174, 1835; *Gray*, *List Mamm. Brit. Mus.* p. 176, 1843.

Dorcelaphus campestris, *Gloger*, *Handbuch Naturgeschichte*, p. 140, 1841.

Cariacus campestris, *Lesson*, *Nouv. Tabl. Règne Anim.*, *Mamm.* p. 173, 1842; *Brooke*, *Proc. Zool. Soc.* 1878, p. 923; *Sclater*, *List Anim. Zool. Gardens*, p. 174, 1883; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 324, 1884; *Flower and Lydekker*, *Study of Mammals*, p. 329, 1891; *Lydekker*, *Horns and Hoofs*, p. 345, 1893; *Aplin*, *Proc. Zool. Soc.* 1894, p. 313; *Ward*, *Records of Big Game*, ed. 2, p. 59, 1896.

Cervus (Elaphus Blastocerus) campestris, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 369, 1844.

Cervus (Elaphus Blastocerus) comosus, *Wagner*, *op. cit.* p. 368, 1844.

Furcifer campestris, *Gray*, *Knowsley Menagerie*, p. 68, 1850.

Blastocerus campestris, *Gray*, *Proc. Zool. Soc.* 1850, p. 237, *Cat. Ungulata Brit. Mus.* p. 224, 1852, *Cat. Ruminants Brit. Mus.* p. 87, 1872, *Hand-List Ruminants Brit. Mus.* p. 158, 1873; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 265, 1862; *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 359, 1873, vol. lxxviii, p. 1, p. 364, 1879.

(?) Cariacus sylvestris, *Gray*, *Ann. Mag. Nat. Hist.* ser. 4, vol. xii, p. 427, 1873.

Blastoceros comosus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien.* vol. lxviii, pt. 1, p. 359, 1873, vol. lxxviii, pt. 1, p. 356, 1879.

Blastoceros azaræ, *Fitzinger*, *op. cit.* vol. lxxviii, p. 359, 1879.

Cervus comosus, *Burmeister*, *Descript. Phys. Repub. Argent.* vol. iii, p. 465, 1879.

Oztoceros campestris, *Ameghino*, *Rev. Arg. Hist. Nat.* vol. i, p. 243, 1891.

Cervus (Blastoceros) campestris, *Ihering*, *Mammiferos de São Paulo*, p. 15, 1894.

Mazama bezoartica, *Lydekker*, *Deer of All Lands*, p. 287, pl. xxii, 1898.

Mazama (Blastoceros) bezoartica, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 365, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 112, 1910, ed. 7, p. 110, 1914.

Odontocœlus bezoarticus, *Elliot*, *Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 50, 1907.

Ozelaphus bezoarticus, *Knottnerus-Meyer*, *Arch. Naturgesch.* vol. lxxiii, p. 98, 1907.

Blastoceros bezoarticus, *Pocock*, *Proc. Zool. Soc.* 1910, p. 966.

Pampas Deer; Veado Branco; Guazuti.

Type of *Ozotoceros* and *Ozelaphus*.

Typical locality Brazil.

Much smaller than the last, and of the approximate size

of a roebuck, but more delicately and slenderly built; antlers of moderate size, with the lower, or front, prong of the main fork simple, and the upper, or posterior, prong divided and more complex, usual number of tines three; muzzle rather pointed; ears moderately large and filled with white hair; tail somewhat bushy; coat short and smooth, with a whorl

Fig. 30.—Pampas Deer (*Blastocerus bezoarticus*).

on middle of back, and a second at base of the neck, so that the hairs on withers are directed forwards; general colour light reddish brown, with the hairs of the back light grey at base, then darker grey followed by a ring of reddish brown, and black at tips; face darker, and occasionally a black patch on crown of head, extending backwards as a line to level of ears; tarsal tuft, a patch at base of backs of ears, a

ring round pedicles of antlers, another round each eye, lips, throat, chest, under-parts, fronts and inner sides of thighs, and inner sides of buttocks and upper part of fore-legs whitish; flanks, outer sides of limbs, and middle of throat lighter than back; tail dark blackish brown above and white below; upper canines generally present in males; young lighter coloured, with a row of white spots on each side of back, and a second from shoulder to thigh.

The range includes the campos of Brazil, Paraguay and Uruguay and the pampas of Argentina and northern Patagonia, also extending into the wooded Chaco country of Argentina in the neighbourhood of Santa Fé. If, as has been suggested, the Pampas form is distinct from the typical Brazilian *campestris*, it should bear the name *azaræ*.

686, *k*. Skeleton, female. South America. *No history.*

686. *k*[1]. Antlers. South America. *No history.*

37. 3. 15. 43 (142, *a*). Skull, with antlers, and skin. Northern Patagonia.

*Presented by Messrs. Burnett and Fitzroy*, 1837.

37. 3. 15. 44 (142, *b*). Skin, young. Same locality.

*Same history.*

37. 3. 15. 44* (142, *c*). Skin, young. Same locality.

*Same history.*

42. 12. 9. 25 (686, *a*). Frontlet and antlers. Northern Patagonia; collected by Admiral Fitzroy during the voyage of H.M.S. "Beagle."

*Presented by the Governors of Haslar Hospital*, 1842.

45. 9. 19. 5. Skin, mounted. Bahia Blanca, Argentina; collected by C. R. Darwin, Esq., during the voyage of H.M.S "Beagle." *Purchased (Zoological Society)*, 1845.

46. 7. 28. 40. Skin, young, mounted. Bolivia; collected by Mr. T. Bridges. *Purchased*, 1846.

52. 2. 26. 1. Skull and antlers, imperfect. South America; collected by Mr. Parzudaki. *Purchased*, 1852.

54. 8. 16. 1 (686, *c*). Skeleton. La Plata; collected by Dr. Bravard. *Purchased*, 1854.

54. 8. 16. 2–3–6 (686, *d*, *e*, *h*). Three skulls, with antlers Same locality and collector. *Same history*

54. 8. 19. 4. Frontlet and antlers. Same locality and collector. *Same history.*

54. 8. 16. 5 and 7 (686, *g* and *i*). Two skulls. Same locality and collector. *Same history.*

60. 8. 31. 4. Skin. South America.
*Purchased* (*Zoological Society*), 1860.

61. 11. 15. 2 (686, *j*). Skeleton. South America.
*Purchased* (*Zoological Society*), 1861.

84. 2. 8. 33. Skull, with antlers. Taquara, Rio Grande do Sul; collected by Dr. H. von Ihering. *Purchased*, 1884.

72. 2. 11. 1. Imperfect skull, with antlers, provisionally referred to this species. Brazil (?); collected by Sir J. Hudson. Type of *Cariacus sylvestris*.
*Presented by Rev. G. J. Hudson*, 1872.

98. 2. 25. 1. Skin. Santa Fé, Argentina.
*Presented by the Duke of Bedford, K.G.*, 1898.

9. 12. 1. 58. Skin, mounted (fig. 30). Ajo, Tuyu, Buenos Aires; collected by Mr. C. H. B. Grant.
*Presented by E. Gibson, Esq.*, 1909.

9. 12. 1. 59. Skull and skin, young. Same locality and collector. *Same history.*

9. 12. 1. 60. Skull. Same locality and collector.
*Same history.*

9. 12. 1. 61. Skull, with antlers, and scalp-skin. Los Yngleses, Buenos Aires; same collector. *Same history.*

9. 12. 1. 62. Skull and skin, female. Same locality and collector. *Same history.*

9. 12. 1. 63. Skull and skin, female. Same locality and collector. *Same history.*

14. 11. 9. 1. Skull, with antlers, and skin. Conceiçâo, Rio Araguaya, Northern Brazil.
*Presented by the Para Museum*, 1914.

## IX. Genus HIPPOCAMELUS.

Hippocamelus, *Leuckart, Dissert. Inaug. de Equo bisulco Molinæ*, p. 24, 1816; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 50, 1907, partim; *Pocock, Proc. Zool. Soc.* 1910, p. 966.

Cervequus, *Lesson, Nouv. Tabl. Règn. Anim., Mamm.* p. 173, 1842.

Furcifer, *Wagner, Schreber's Säugthiere, Suppl.* vol. iv, p. 384, 1844; Sundevall, *K. Svenska Vet.-Ak. Handl.* 1844, p. 183, 1846; *Gray, Cat. Ungulata Brit. Mus.* p. 226, 1852, *Cat. Ruminants Brit. Mus.* p. 88, 1872; *Brooke, Proc. Zool. Soc.* 1878, p. 923;

*Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 49, 1881; nec *Fitzinger*, 1843.

Xenelaphus, *Gray, Proc. Zool. Soc.* 1869, p. 498, *Cat. Ruminants Brit. Mus.* p. 89, 1872; *Lydekker, Decr of All Lands*, p. 293, 1898.

Anomalocera, *Gray, Scientific Opinion*, 1869, p. 384; *Philippi, Wiegmann's Archiv* 1870, p. 46; nec *Templer*, 1837.

Huamela, *Gray, Ann. Mag. Nat. Hist.* ser. 4. vol. xi, p. 217, 1873, *Hand-List Ruminants Brit. Mus.* p. 159, 1873.

Creagroceros, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 358, 1873, vol. lxxviii, pt. 1, p. 369, 1879.

Antlers (fig. 31) small and simple, forming a single dichotomous fork, of which the front prong is the smaller, and curves upwards and backwards towards the hind one; metatarsal gland and tuft absent; tail short and rather bushy; face moderately long; face-glands large and exposed, and gland-pits in skull deep and triangular, although not very large; upper canines present in both sexes, but not projecting beyond lips; coat coarse and brittle; size medium; young uniformly coloured. Other characters much as in two preceding genera. The genus is distinguished by the simply forked antlers, coarse, brittle coat, and absence of metatarsal glands.

The range includes the western and southern parts of South America.

The two species appear distinguishable as follows:—

A. Size larger, a dark Y-shaped face-stripe, antlers usually forking some distance above burr ..... *H. bisulcus.*

B. Size smaller, face without distinct dark stripe, antlers forking close to burr ..... *H. antisensis.*

## 1. HIPPOCAMELUS BISULCUS.

Equus bisulcus, Molina, *Saggio Storia Nat. Chili*, p. 320, 1782.

Hippocamelus dubius, *Leuckart, Dissert. Inaug. de Equo bisulco Molinæ*, p. 24, 1816.

Auchenia huamel, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 764, 1827.

Cervequus andicus, *Lesson, Nouv. Tabl. Règn. Anim., Mamm.* p. 173, 1842.

Cervus chilensis, *Gay and Gervais, Ann. Sci. Nat., Zool.* ser. 3, vol. viii, p. 91, 1846; *Sclater, Proc. Zool. Soc.* 1878, p. 45; *Burmeister, Descript. Phys. Répub. Argent.* vol. iii, p. 462, 1879; *Philippi, An. Mus. Chile, Zool.* 1892, p. 7, 1894, p. 8.

Capreolus leucotis, *Gray*, *Proc. Zool. Soc.* 1849, p. 64.

Furcifer huamel, *Gray*, *Proc. Zool. Soc.* 1850, p. 236, *Cat. Ungulata Brit. Mus.* p. 227, 1852; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 266, 1862.

Furcifer antisiensis, *Gray*, *Cat. Ungulata Brit. Mus.* p. 226, 1852, *Cat. Ruminants Brit. Mus.* p. 88, 1872; nec *d'Orbigny*.

Huamela leucotis, *Gray*, *Ann. Mag. Nat. Hist.* ser. 4, vol. x, p. 445, 1872, vol. xi, p. 219, 1873, *Hand-List Ruminants Brit. Mus.* p. 160, 1873.

Creagroceros chilensis, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 358, 1873, vol. lxxviii, pt. 1, p. 372, 1879.

Cariacus chilensis, *Brooke*, *Proc. Zool. Soc.* 1878, p. 923; *Flower and Lydekker*, *Study of Mammals*, p. 329, 1891; *Lydekker*, *Horns and Hoofs*, p. 346, 1893.

Furcifer chilensis, *Sclater*, *List Anim. Zool. Gardens*, p. 178, 1883; *Nehring*, *Sitzber. Ges. nat. Freunde*, 1895, p. 12.

Cervus antisiensis, *Schäff*, *Zool. Garten*, vol. xxxi, p. 228, 1890; nec *d'Orbigny*.

Mazama bisulca, *Lydekker*, *Deer of All Lands*, p. 296, 1898, *Proc. Zool. Soc.* 1899, p. 917, pl. lxi; *Berg*, *Commun. Mus. B. Aires*, vol. i, p. 261, 1900.

Hippocamelus bisulcus, *Thomas*, *Proc. Zool. Soc.* 1898, p. 212; *Pocock*, *ibid.* 1910, p. 966; *Wolffsohn*, *Rev. Chil. Hist. Nat.* vol. xiv, p. 227, 1910.

Mazama (Xenelaphus) bisulca, *Lydekker*, *Great and Small Game of Europe, etc.* p. 368, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 113, 1910, ed. 7, p. 111, 1914.

Xenelaphus bisulcus, *Prichard*, *Proc. Zool. Soc.* 1902, vol. i, p. 272, *Through the Heart of Patagonia*, p. 248, 1902.

(?) Odocoileus dickii, *Goeldi*, *Mitt. nat. Ges. Bern*, 1912, p. 12.

Guemal or Huemul.

Size large, shoulder-height about 39½ inches; general colour bright greyish yellow, speckled with black, this including buttocks, greater portion of under-parts, and limbs, in winter apparently greyer; a broad black band up middle line of face terminating in a fork between eyes; sides of muzzle brown and tip of chin white; tail coloured like back above, white below; tarsal tuft like back; antlers (fig. 31) forking at a considerable distance above burr.

The range includes the Andes of southern Chile and the whole of Patagonia. *Odocoileus dickii* was founded on a skull and antlers from Santa Fé, probably referable to the present species, the antlers being evidently abnormal.

50. 8. 2. 1. Skin. Valparaiso, Chile.
*Presented by the Earl of Derby*, 1850.

72. 11. 1. 1 (1584, *a*). Skull, with antlers, and skin. West Coast of Patagonia; collected by Dr. E. Simpson. *Purchased*, 1872.

Fig. 31.—Head of Chilian Guemal (*Hippocamelus bisulcus*).
From Lydekker, *Proc. Zool. Soc.* 1899.

72. 11. 1. 2 (1584, *b*). Skull and skin. Same locality and collector. *Same history.*

98. 2. 4. 14–15. Two frontlets, with antlers. Chubut, Patagonia; collected by H. Durnford, Esq. *Purchased*, 1898.

99. 2. 22. 14. Skin, mounted. Patagonia.

*Presented by the Director of the La Plata Museum*, 1899.

99. 8. 31. 1. Head, in summer coat, mounted. Ultima Esperanza, Patagonia. *Presented by Señor Masentli*, 1899.

2. 3. 15. 1. Skull and antlers. Rio de los Antiguos, Patagonia. *Presented by H. Hesketh Prichard, Esq.*, 1902.

2. 3. 15. 2. Skin. Same locality. *Same history.*

2. 3. 15. 3. Skin. Same locality. *Same history.*

## II. HIPPOCAMELUS ANTISENSIS.

Cerf d'Antis, *Pucheran, Dict. Univ. Hist. Nat.* vol. iii, p. 328.

Cervus antisensis, *d'Orbigny, Ann. Mus. Paris*, vol. iii, p. 91, 1834, *Voyage Amer. Mérid.* vol. iv, pt. 2, p. 28, pl. xx, 1847; *Philippi, An. Mus. Chile, Zool.* 1892, p. 7, 1894, p. 6.

Cervus (Elaphus Furcifer) antisiensis, *Wagner, Schreber's Säugthiere, Suppl.* vol. iv, p. 384, 1844.

Cervus (Furcifer) antisiensis, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 183, 1846.

Cervus antisiensis, *Tschudi, Fauna Peruv.* vol. i, p. 241, pl. xviii, 1844; *Sclater, Proc. Zool. Soc.* 1875, p. 46; *Matschie, Sitzber. Ges. nat. Freunde*, 1894, p. 63.

Anomalocera huamel, *Gray, Scientific Opinion*, 1869, p. 384.

Xenelaphus huamel, *Gray, Proc. Zool. Soc.* 1869, p. 497.

Xenelaphus leucotis, *Gray, Cat. Ruminants Brit. Mus.* p. 89, 1872.

Xenelaphus anomalocera, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. x, p. 445, 1872.

Xenelaphus chilensis, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. xii, p. 61, 1873, *Hand-List Ruminants Brit. Mus.* p. 159, 1873.

Creagoceros antisiensis, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 358, 1873, vol. lxxviii, pt. 1, p. 369, 1879.

Furcifer chilensis, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. xiii, p. 332, 1874.

Cariacus antisiensis, *Brooke, Proc. Zool. Soc.* 1878, p. 924; *Schäff, Zool. Garten*, vol. xxxi, p. 226, 1890; *Flower and Lydekker, Study of Mammals*, p. 329, 1891; *Lydekker, Horns and Hoofs*, p. 346, 1903.

Furcifer antisensis, *Nehring, Sitzber. Ges. nat. Freunde*, 1895, p. 9.

Mazama antisiensis, *Lydekker, Deer of All Lands*, p. 295, pl. xxiii, 1898.

Mazama (Xenelaphus) antisiensis, p. 367, 1901; *Ward, Records of Big Game*, ed. 6, p. 112, 1916, ed. 7, p. 110, 1914.

Hippocamelus antisiensis, *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 52, 1907; *Pocock, Proc. Zool. Soc.* 1910, p. 966; *Osgood, Field Mus. Zool. Pub.* vol. x. p. 153, 1914.

Odocoileus antisensis, *Dabbene*, *An. Mus. B. Aires*, ser. 3, vol. xiv, p. 293, 1911.

Peruvian Guemal.

Typical locality Peruvian Andes.

Smaller than preceding species, the shoulder-height being about 34 inches; general colour much the same as in latter, but under-parts markedly lighter than back, and a patch on rump and basal portion of upper side of tail brown; tarsal tuft blackish brown; antlers forking nearer burr.

The range includes the Andes of Peru, Ecuador, Bolivia, and northern Chili, usually at heights of between 14,000 and 16,000 feet above the sea-level, but probably ranging down to 11,000 feet, and also part of northern Argentina. In Ecuador this species is abundant on Chimborazo, Pichincha, and Cotopaxi.

69. 10. 15. 1. Skull, with antlers, and skin, formerly mounted. Tinta, southern Peru; collected by Mr. H. Whiteley. Type of *Xenelaphus anomalocera*. *Purchased*, 1869.

69. 10. 15. 2 (1525, *a*). Skull and skin, female. Same locality and collector. *Same history.*

69. 10. 15. 3 (1525, *c*). Skull and skin, young. Same locality and collector. *Same history.*

69. 10. 15. 4 (1525, *d*). Skull and skin, young. Same locality and collector. *Same history.*

69. 10. 15. 5 (1525, *e*). Skull, female. Same locality and collector. *Same history.*

* * * *. Skull and antlers. Locality unknown. *No history.*

74. 3. 27. 1. Skin, mounted. Ceachupati, Peru; collected by Mr. H. Whitely. *Purchased*, 1872.

94. 11. 20. 4. Skull and skin, female. Incapirca, Junin, Peru; collected by Mr. J. Kalinowski. *Purchased*, 1894.

97. 11. 11. 4–5. Two skulls. Tinta, Peru; collected by Mr. H. Whitely; formerly in collection of Sir Victor Brooke, Bart. *Presented by Sir Douglas Brooke, Bart*, 1897.

## X. Genus MAZAMA.

Mazama, Rafinesque, *Amer. Month. Mag.* vol. i, p. 44, 1817; *Merriam, Science*, ser. 2, vol. i, p. 208, 1895; *Lydekker, Deer of All Lands*, pp. 243 (partim) and 298, 1898; *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 79, 1904; *Pocock, Proc. Zool. Soc.* 1910, p. 264; *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 585, 1913.

Subulo, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 318, 1827; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxix, pt. 1, p. 7, 1879; nec Subula, *Schumacher*, 1817.

Passalites, *Gloger, Handbuch Naturgeschichte*, p. 140, 1841.

Subula, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842; nec *Schumacher*, 1817.

Coassus, *Gray, List Mamm. Brit. Mus.* p. 174, 1843, *Cat. Ungulata Brit. Mus.* p. 238, 1852, *Cat. Ruminants Brit. Mus.* p. 91, 1872; *Brooke, Proc. Zool. Soc.* 1878, p. 924; *Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 31, 1881.

Homelaphus, *Gray, Cat. Ruminants Brit. Mus.* p. 90, 1872.

Nanelaphus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 360, 1873, vol. lxxix, pt. 1, p. 31, 1879.

Doryceros, *Fitzinger, op. cit.* vol. lxviii, p. 360, 1873, vol. lxxix, p. 23, 1879.

Small deer nearly allied to the three preceding genera, but distinguished by the following characters:—

Antlers in the form of simple unbranched spikes; metatarsal gland and tuft absent, and tarsal gland in some species rudimentary or perhaps obsolete; tail very short; face elongated; face-glands small and exposed, and gland-pits deep and triangular; crown of head tufted, and hair of face radiating from two whorls, one on crown and the other below line of eyes, the hair of forehead being directed upwards towards antlers, and that of nose downwards towards muzzle; upper canines occasionally present in old males; coat fine and smooth; build clumsy, with the back much arched, and profile of face convex; young spotted with white. Ears of medium length; upper lip with a pair of white spots on each side of nose, and lower lip with a larger white spot in middle line.

The range includes Central and Tropical South America.

The following is a "key" to the species:—

A. Lachrymal pits in skull deeper.
  *a*. Size larger ..... *M. rufina.*
  *b*. Size smaller ..... *M. bricenii.*

B. Lachrymal pits shallower.
  *a*. Colour rufous, white below.
    *a'*. Hair of withers reversed.
      *a''*. Premaxillæ articulating with nasals; skull longer.
        $a^3$. Face not markedly dark, without eyebrow-streak ..... *M. americana.*
        $b^3$. Face markedly dark, with eyebrow-streak ..... *M. superciliaris.*
      *b''*. Premaxillæ not articulating with nasals; skull shorter ..... *M. zetta.*
    *b'*. Hair of withers not reversed ..... *M. sheila.*
    *c'*. Hair of withers either normal or reversed, size small, face and limbs shaded with bluish black ..... *M. tema.*
  *b*. Colour brown to whitish grey.
    *b'*. Colour pale pepper-and-salt brown to whitish grey, size larger ..... *M. simplicicornis.*
    *c'*. Colour dark brown tinged with rufous, size very small ..... *M. nana.*
  *c*. Colour drab-brown, tail fulvous ..... *M. pandora.*

## I. MAZAMA AMERICANA.

Moschus americanus, *Erxleben*, *Syst. Regn. Anim.* vol. i, p. 324, 1777.

Cervus rufus, *Illiger. Abh. Ak. Sci. Berlin*, 1811, p. 108, 1815;* *Desmarest*, *Mammalogie*, vol. ii, p. 245, 1822; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 140, 1827; *Tschudi*, *Fauna Peruv.* vol. i, p. 236, 1844; *F. Cuvier*, *Dict. Sci. Nat.* vol. vii, p. 127, 1817; *Burmeister*, *Deseript. Phys. Répub. Argent.* vol. iii, p. 465, 1879.

Mazama pita, *Rafinesque*, *Amer. Month. Mag.* vol. i, p. 363, 1817.

Cervus (Subulo) rufus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 318, 1827; *Goeldi*, *Mammiferos do Brasil*, p. 108, 1893.

Subulo rufus, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 178, 1835.

(?) Subulo apura, *Swainson*, *Classif. Quadrupeds*, p. 295, 1835.

Coassus rufus, *Gray*, *List Mamm. Brit. Mus.* p. 174, 1843, *Knowsley Menageric*, p. 69, pl. xlvii, 1850, *Cat. Ungulata Brit. Mus.* p. 238, 1852, *Cat. Ruminants Brit. Mus.* p. 92, 1872, *Hand-List Ruminants Brit. Mus.* p. 161, 1873; *Queleh*, *Zoologist*, ser. 3, vol. xvii, p. 19, 1893.

Cervus (Subulo) dolichurus, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 389, 1844.

Homelaphus inornatus, *Gray*, *Cat. Ruminants Brit. Mus.* p. 90, 1872.

Coassus inornatus, *Gray*, *Hand-List Ruminants Brit. Mus.* p. 162, 1873.

Subulo dolichurus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 359, 1873, vol. lxxix, pt. 1, p. 11, 1879.

* Separate copies stated to have been issued in 1811.

Subulo rufus, *Fitzinger, op. cit.* vol. lxviii, p. 360, 1873, vol. lxxix, p. 11, 1879.

Cariacus rufus, *Brooke, Proc. Zool. Soc.* 1878, p. 925; *Selater, List Mamm. Zool. Gardens*, p. 174, 1883; *Lydekker, Horns and Hoofs*, p. 348, 1893.

Cervus (Coassus) rufus, *Ihering, Mammiferos de São Paulo*, p. 15, 1894.

Mazama rufa, *Lydekker, Deer of All Lands*, p. 300, 1898, *Great and Small Game of Europe, etc.* p. 370, 1901.

Mazama inornata, *Lydekker, Deer of All Lands*, p. 306, 1898.

Mazama americana, *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 585, 1913; *Stone, Proc. Ac. Nat. Sci. Philad.* 1914, p. 15; *Lydekker, Ward's Records of Big Game*, ed. 7, p. 111, 1914.

Red Brocket; Veado Pardo or Veado Mateiro.

The type species. Also type of *Homelaphus*.

Typical locality Guiana.

Size relatively large, and build heavy; height at shoulder about 27 inches; hair of middle line of nape generally reversed; general colour shining brownish red (rufous), sometimes with minute dark tips to the hairs; sides of neck and flanks reddish grey; throat, under surface of upper part of neck, and inner sides of thighs whitish grey; tail brownish red above, white below and at tip; a small whitish streak on rump; a large spot on front of lower lip and a smaller one on each side of upper lip below nose white; antlers yellowish white; lachrymal pits relatively shallow; premaxillæ usually articulating with nasals.

The range extends from Guiana to Paraguay and Rio Grande do Sul.

The two local races are distinguishable as follows:—

A. Size larger; skull longer (205 to 210 mm.)..... *M. a. americana.*

B. Size smaller; skull shorter (202 mm.)..... *M. a. jucunda.*

## A.—Mazama americana americana.

Typical locality Guiana.

General characters those of the species; skull relatively long.

The range includes Peru, Ecuador, Bolivia, Brazil, and Paraguay.

684, *a*. Skeleton, mounted. South America.
*Purchased* (*Brandt*).

1037, *a*. Skull, with antlers. Bahia, Brazil. *No history.*

41. 594. Skull and skin, female. South America; collected by Parreys. *Purchased.*

41. 595. Skin, mounted. South America; same collector. *Purchased.*

45. 8. 509 (684, *b*). Skull. Para, Amazonia.
*Presented by J. P. G. Smith, Esq.*, 1845.

46. 4. 21. 7 (684, *c*). Skeleton, immature.
*Purchased* (*Brandt*), 1846.

51. 8. 29. 7. Skin, female, formerly mounted. South America. Type of *Homelaphus inornatus;* referred to by Gray as a male, a statement copied by the present writer in *Deer of All Lands.* *Purchased* (*Zoological Society*), 1851.

66. 3. 28. 14. Skin. Upper Ucayali Valley, Peru; collected by Mr. C. Bartlett. *Purchased*, 1866.

80. 5. 6. 38. Skin. Sarayacu, Ecuador; collected by Mr. C. Buckley. *Purchased*, 1880.

80. 5. 6. 39. Skin, young. Same locality and collector.
*Same history.*

82. 9. 30. 24. Skull and antlers. Taquara, Rio Grande do Sul, Brazil; collected by Dr. H. von Ihering.
*Purchased*, 1882.

82. 9. 30. 25. Skull, female. Same locality and collector.
*Same history.*

1. 11. 3. 91. Skull, with antlers, and skin. Rio Jordao, Minas Geraes; collected by Mr. A. Robert. *Purchased*, 1901.

1. 11. 3. 92. Skull, with antlers, and skin. Same locality and collector. *Same history.*

2. 1. 1. 114. Skull, with antlers, and skin. Charuplaya, Bolivia; collected by Mr. P. O. Simons.
*Presented by O. Thomas, Esq.*, 1902.

3. 7. 7. 129. Skull and skin, young in spotted coat. Serra de Chapada, Matto Grosso, Brazil; collected by Mr. A. Robert. *Presented by Mrs. Percy Sladen.*

3. 7. 7. 130. Skull, with antlers, and skin. Same locality and collector. *Same history.*

4. 7. 4. 88. Skull and skin, female. Igarapé Assu, Para, Amazonia; collected by Mr. A. Robert.
*Presented by O. Thomas, Esq.*, 1904.

4. 7. 4. 89. Skull and skin, immature female. Same locality and collector. *Same history.*

8. 5. 9. 27. Skull, with antlers, and skin. Humaytha Valley, Madeira, Amazonia; collected by Mr. W. Hoffmanns. *Purchased*, 1908.

10. 5. 4. 58. Skull and skin, young in short, dark, spotted coat. Supinaam Valley, British Guiana; collected by Mr. Cozier. This and the following specimens from the same district are topo-types of the species. *Presented by F. V. McConnell, Esq.*, 1910.

10. 5. 4. 59. Skull, with antlers, and skin. Same locality and collector. *Same history.*

11. 12. 15. 17. Skull and skin, female. Same locality and collector. *Same donor*, 1911.

11. 12. 15. 18. Skull and skin, young in dark, spotted coat. Same locality and collector. *Same history.*

11. 12. 15. 19. Skull and skin, female. Same locality and collector. *Same history.*

13. 5. 28. 11. Skull, with antlers, and skin. Bonasica, Essequibo Valley, British Guiana; same locality and collector. *Same donor*, 1913.

14. 11. 9. 2. Skull, with antlers and skin. Conceição, Rio Araguaya, northern Brazil. *Presented by the Para Museum*, 1914.

## B.—Mazama americana jucunda.

Mazama americana jucunda, *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 587, 1913.

Typical locality Roça Nova, Serra do Mar, Parana, southern Brazil.

Distinguished from typical race by inferior size and shorter skull, of which the basal length is about 202 mm., against from 205 to 210 mm. in former; coat of medium length; general colour bright rufous fawn; limbs brown above, rufous on pasterns; tail dark rufous above.

3. 7. 1. 103. Skull and skin, immature female. Roça Nova, Serra do Mar, Parana; collected, Sept. 9, 1901, by Mr. A. Robert. Type. *Presented by Mrs. Percy Sladen*, 1903.

3. 7. 1. 200. Skull and antlers. Same locality and collector. *Same history.*

*The following specimens probably represent this or a nearly allied brocket (? M. superciliaris)* :—

46. 6. 1. 23 (684, *g*). Skull, with antlers, and skin. Santa Catherina, Brazil (between Parana and Rio Grande do Sul); collected by Parzudaki. *Purchased*, 1846.

46. 6. 1. 24. Skin, female. Same locality and collector. *Same history.*

46. 6. 1. 25 (684, *f*). Skull, young, and skin, old female. Same locality and collector. *Same history.*

## II. MAZAMA SUPERCILIARIS.

Coassus superciliaris, *Gray*, *Proc. Zool. Soc.* 1850, p. 242, pl. xxv, *Ann. Mag. Nat. Hist.* ser. 2, vol. ix, p. 432, 1852, *Cat. Ungulata Brit. Mus.* p. 239, 1852, *Cat. Ruminants Brit. Mus.* p. 92, 1872, *Hand-List Ruminants Brit. Mus.* p. 160, 1873.

Cervus (Subulo) superciliaris, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. v, p. 386, 1855.

Subulo superciliaris, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 360, 1873, vol. lxxix, pt. 1, p. 18, 1879.

Cariacus superciliaris, *Brooke*, *Proc. Zool. Soc.* 1878, p. 926.

Mazama superciliaris, *Lydekker*, *Deer of All Lands*, p. 301, 1898, *Great and Small Game of Europe*, *etc.* p. 371, 1901.

Typical locality Brazil (? Santa Catherina).

Closely allied to the last, of which it is not improbably merely a local variety or colour-phase; general colour shining brownish red; neck, chest, hocks, and fronts of fore-legs whitish grey; forehead blackish, with a distinct streak over each eye.

49. 1. 12. 35. Skull, with antlers, and skin, immature. South America (? Santa Catherina, Brazil); collected by Hultze. Type. If from Santa Catherina, this and the following specimen are not even racially separable from the foregoing specimens from the same locality. *Purchased*, 1849.

49. 9. 3. 1–2. Skin and skull. Same locality and collector. *Same history.*

## III. MAZAMA ZETTA.

Mazama zetta, *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 586, 1913.

Typical locality Medellin, Antioquia, Colombia.

Generally similar to *M. americana*, but build rather stouter, and general colour browner and less rufous (rufous brown), especially on head, ears, and neck, the head having indistinct rufous markings; skull shorter and stouter (basal length 187–190 mm.), with shorter premaxillæ, which but rarely reach nasals. The question whether this brocket might not be preferably regarded as a local race of *M. americana* is reserved.

78. 8. 31. 1. Skin. Medellin, Antioquia, Colombia; collected by Mr. J. K. Salmon. *Purchased*, 1878.

78. 8. 31. 2. Skin, formerly mounted, and skull, female. Same locality and collector. *Same history.*

78. 8. 31. 3. Skull and skin, female. Same locality and collector. Type. *Same history.*

78. 8. 31. 3*. Skin, young. Same locality and collector. *Same history.*

78. 8. 31. 13 (1700, *a*). Skeleton, female. Same locality and collector. *Same history.*

78. 8. 31. 14 (1700, *b*). Skull, with antlers. Same locality and collector. *Same history.*

85. 4. 22. 6–7. Two skulls, with antlers. Same locality and collector. *Purchased*, 1885.

85. 4. 22. 8. Skull, female. Same locality and collector. *Same history.*

14. 5. 28. 25. Skull, with antlers, and skin. Condoto, Chaco, Colombia. *Presented by Dr. H. G. F. Spurrell*, 1914.

14. 5. 28. 26. Skull and skin, female. Same locality. *Same history.*

*The following specimens appear to indicate a brocket nearly related to this race:—*

14. 4. 25. 80. Skull, with antlers, and skin. Gualaquiza. Ecuador; collected by Mr. G. Hammond.

*Presented by O. Thomas, Esq.*, 1914.

14. 4. 25. 81. Skull and skin, female. Same locality and collector. *Same history.*

14. 4. 25. 82. Skin. Same locality and collector. *Same history.*

14. 4. 25. 83. Skull, female. Same locality and collector. *Same history.*

## IV. MAZAMA SHEILA.

Mazama sheila, *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 587, 1913.

Typical locality near Merida, Venezuela.

A lowland-form distinguished from the three preceding species by its inferior size (basal length of skull about 177 mm.), the normal direction of the hair of the nape, and the pale bright rufous general colour; skull of the short type of that of *M. zetta*, with the premaxillæ not reaching nasals.

13. 4. 24. 4. Skull, with antlers, and skin. Montaña de Limones, Merida; collected by the Messrs. Briceño, October, 1910. Type. *Purchased (Rosenberg)*, 1913.

## V. MAZAMA TEMA.

Mazama tema, *Rafinesque, Amer. Month. Mag.* vol. i, p. 44, 1817; *Lydekker, Deer of All Lands*, p. 302, 1898, *Great and Small Game of Europe, etc.* p. 379, 1901, partim; *Miller, List N. Amer. Mamm.* p. 390, 1912; *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. i, p. 349, 1908, vol. xi, p. 586, 1913.

Cervus humboldtii, *Wiegmann, Isis*, 1833, p. 954, nomen nudum.

Cervus sartorii, *Saussure, Rev. Mag. Zool.* ser. 2, vol. xii, p. 252, 1860.

Subulo sartorii, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxxix, pt. 1, p. 20, 1879.

Cariacus tema, *Alston, Biol. Centr.-Amer., Mamm.* p. 118, 1879; *Rhoads, Amer. Nat.* vol. xxviii, p. 526, 1894.

Cariacus rufinus, *Alston, Biol. Centr.-Amer., Mamm.* p. 118, 1879; *True, Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1885; nec Cervus rufinus, *Pucheran.*

Mazama sartorii, *Lydekker, Deer of All Lands*, p. 303, pl. xxiv, fig. 2, 1898, *Great and Small Game of Europe, etc.* p. 372, 1901; *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 80, 1904.

Hippocamelus sartori, *Elliot, Check-List Mamm. N. Amer. etc.* (*Field Mus. Zool. Pub.* vol. vi) p. 50, 1905, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 51, 1907.

Typical locality Mexico, probably the State of Vera Cruz.

Smaller than *M. americana*, the shoulder-height ranging from 25½ to 20½ inches; hair of withers either normal or reversed; general colour bright shining brownish red; neck, throat, and chest fawn; abdomen white; outer sides of hind-shanks, fronts of fore-legs, and lower part of face shaded with bluish black; tail like back above, white below; the usual white spots on lips; antlers whitish horn-colour, and less rugose than those of *M. americana*.

The distinctive features of this species are the small size, the dark shading of the face and limbs, and the blackish red (instead of whitish) throat.

The range includes southern Mexico and Central America.

The three races are distinguished as follows:—

A. Size smaller, colour brighter and more rufescent... *M. t. tema.*

B. Size larger, colour duller and less rufescent..... *M. t. reperticia.*

C. Colour darker and redder than in either of the preceding..... *M. t. cerasina.*

## A.—Mazama tema tema.

Mazama tema tema, *Goldman, Smithson. Misc. Collect.* vol. lx, no. 22, p. 2, 1913.

Typical locality southern Mexico.

Size relatively small; colour bright and strongly rufescent.

88. 8. 8. 5. Skull, with antlers, and scalp-skin. Atoyac, Vera Cruz, Mexico; collected by Mr. H. H. Smith.

*Presented by Messrs. Salvin and Godman*, 1888.

91. 3. 24. 2 (1700, *d*). Skull, with antlers, and skin, formerly mounted. Guatemala; collected by Boucard.

*Purchased*, 1891.

91. 3. 24. 3 (1700, *c*). Skull and skin, immature female. Same locality and collector. *Same history.*

91. 3. 24. 4. Skin, young. Same locality and collector. *Same history.*

93. 2. 5. 23. Skull and skin, the latter in the young spotted coat. Sierra de Rosario, Jalisco, Mexico; collected by Dr. A. G. Buller. *Purchased*, 1893.

### B.—Mazama tema reperticia.

Mazama tema reperticia, *Goldman*, *Smithson. Misc. Collect.* vol. lx, no. 22, p. 2, 1913.

Typical locality Gatun, Panama.

Type in U.S. National Museum, Washington.

Somewhat larger than typical race, and duller and much less rufescent in colour. Similar in size to *M. pandora* (*infra*) but darker and with differences in skull; larger than *M. bricenii* (*infra*), with shorter coat, especially on neck, less rich rufescent colour, and a smaller dark area on face.

78. 7. 6. 4 (1700, *c*). Skull and skin, immature female. Costa Rica; collected by Mr. Rogers.

*Presented by F. du Cane Godman, Esq.*, 1878.

### C.—Mazama tema cerasina.

Mazama tema cerasina, *Hollister*, *Proc. Biol. Soc. Washington*, vol. xxvii, p. 209, 1914.

Typical locality Talamanca, Costa Rica.

Type in U.S. National Museum, Washington.

Distinguished from both the typical Mexican and the Panama races by the darker and distinctly more reddish general colour.

No specimen in collection.

## VI. MAZAMA BRICENII.

Mazama bricenii, *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. i, p. 349, 1908; *Pocock*, *Proc. Zool. Soc.* 1910, p. 964; *Osgood*, *Field Mus. Zool. Pub.* vol. x, p. 45, 1912; *Lönnberg*, *Arkiv Zool.* vol. viii, no. 16, p. 34, 1913.

Typical locality Paramo de la Culata, Merida, Venezuela.

In general appearance and colour very like *M. tema*, but size smaller (basal length of skull about 143 mm.), and lachrymal pits of skull deeper, the whole skull being also slighter with proportionately smaller orbits and the premaxillæ articulating extensively with nasals; general colour rich chestnut-rufous, with the head, ears, nape, fore-limbs,

and hind-shanks dark brown; under-parts somewhat lighter; tail brown above, with a few rufous hairs.

5. 7. 5. 18. Skull and skin, young female. Merida; collected by Señor S. Briçeño. *Purchased* (*Rosenberg*), 1905.

8. 6. 24. 5. Skull and skin, female. Paramo de la Culata, Mexico (August, 1907); same collector. *Purchased* (*Rosenberg*), 1908.

8. 6. 24. 6. Skull and skin, very young. Same locality and collector. *Same history.*

13. 4. 24. 3. Skull, with antlers, and skin. Merida; same collector. *Purchased* (*Rosenberg*), 1913.

## VII. MAZAMA RUFINA.

Cervus rufinus, *Pucheran*, *Arch. Mus. Paris*, vol. vi, p. 491, 1852.
Coassus rufinus, *Gray*, *Hand-List Ruminants Brit. Mus.* p. 162, 1873.
Subulo rufinus, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 162, 1873, vol. lxxix, pt. 1, p. 17, 1879.
Cariacus rufinus, *Brooke*, *Proc. Zool. Soc.* 1878, p. 925.
Mazama rufina,* *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. i, p. 349, 1908, vol. xi, p. 586, 1913.

Typical locality Ecuador, at an elevation of about 11,000 feet.

Type in Paris Museum.

A mountain-form allied to, but larger than (shoulder-height about 25½ inches), *M. bricenii*.

77. 4. 3. 1. Skin, immature. Jima, Ecuador; collected by C. Buckley, Esq. *Purchased*, 1877.

96. 1. 28. 5*. Skull, probably referable to this species. Ecuador; figured by De Winton, *Proc. Zool. Soc.* 1896, p. 510, as *Pudua mephistophiles*, see Thomas, *op. cit.* 1908, p. 350. *Presented by L. Söderström, Esq.*, 1896.

## VIII. MAZAMA SIMPLICICORNIS.

Cervus simplicicornis, *Illiger*, *Abh. Ak. Sci. Berlin*, 1811, p. 107, 1815†; *Wied*, *Naturgesch. Brasil*, vol. ii, p. 596, 1827; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 141, 1827; *Burmeister*, *Descript. Phys. Répub. Argent.* vol. iii, p. 466, 1879; *Goeldi*, *Mammiferos do Brasil*, p. 108, 1893.

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* *M. rufinus* in first passage. † See note, p. 199.

Mazama bira, *Rafinesque, Amer. Month. Mag.* vol. i, p. 368, 1817.
Cervus nemorivagus, *F. Cuvier, Dict. Sci. Nat.* vol. vii, p. 485, 1817; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 142, 1827.
Cervus (Subulo) nemorivagus, *H. Smith, Griffith's Animal Kingdom*, vol. v, 319, 1827.
Cervus (Subulo) simplicicornis, *H. Smith, op. cit.* vol. v, p. 381, 1827.
Passalites nemorivagus, *Gloger, Handbuch Naturgeschichte*, p. 140, 1841.
Coassus nemorivagus, *Gray, Cat. Ungulata Brit. Mus.* p. 238, 1852, *Cat. Ruminants Brit. Mus.* p. 91, 1872, *Hand-List Ruminants Brit. Mus.* p. 160, 1873; *Quelch, Zoologist*, ser. 3, vol. xvii, p. 19, 1893; *Rendall, ibid.* ser. 4, vol. i, p. 345, 1897.
Coassus simplicornis, *Gray, Cat. Ungulata Brit. Mus.* p. 238, 1852, *Cat. Ruminants Brit. Mus.* p. 91, 1872, *Hand-List Ruminants Brit. Mus.* p. 160, 1873; *Quelch, Zoologist*, ser. 3, vol. xvii, p. 19, 1893.
Doryceros nemorivagus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 360, 1873, vol. lxxix, pt. 1, p. 23, 1879.
Cariacus simplicornis, *Brooke, Proc. Zool. Soc.* 1878, p. 925; *Lydekker, Horns and Hoofs*, p. 348, 1893.
Cariacus nemorivagus, *Brooke, Proc. Zool. Soc.* 1878, p. 925; *Sclater, List Anim. Zool. Gardens*, p. 174, 1883; *Lydekker, Horns and Hoofs*, p. 394, 1893.
Cervus (Coassus) simplicicornis, *Ihering, Mammiferos de S. Paulo*, p. 15, 1894.
Mazama nemorivaga, *Lydekker, Deer of All Lands*, p. 303, 1898, *Great and Small Game of Europe, etc.* p. 372, 1901; *Ward, Records of Big Game*, ed. 6, p. 113, 1910, ed. 7, p. 111, 1914; *Pocock, Proc. Zool. Soc.* 1910, p. 962.*
Mazama americana, *Osgood, Field Mus. Zool. Pub.* vol. x, p. 43, 1912; nec Cervus americanus, *Erxleben.*
Hippocamelus nemorivagus, *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 52, 1907.
Mazama americana, *Osgood, Field Mus. Zool. Pub.* vol. x, p. 43, 1912; nec *Moschus americanus, Erxleben*, 1777.
Mazama simplicicornis, *Hagmann, Archiv Rassen- und Gesell.-Biol.* vol. v, p. 14, 1908; *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 585, 1912.

Type of *Doryceros.*

Typical locality Brazil.

Build light and slender, and size small, the shoulder-height being about 19 inches; general colour varying from pale pepper-and-salt brown to greyish or whitish, usually with a distinct streak on the forehead before the front of the eyes; never any sign of reddish at any season; hairs of back ringed with yellowish red below the tip; under-parts buffish;

* *M. nemorivagus.*

tarsal gland and tuft small; * antlers short, fine, and dirty white in colour.

Range co-extensive with that of *M. americana*, but also including Trinidad.

### A.—Mazama simplicicornis simplicicornis.

Typical locality Brazil.

General characters those of species.

141, *a*. Skull and skin, female. Locality unknown.
*No history.*

41. 593. Skull and skin, female. Brazil; collected by Parreys. *Purchased.*

44. 9. 11. 107. Skin, formerly mounted. British Guiana; collected by Sir R. Schomburgk. *Purchased*, 1844.

46. 2. 13. 3 (46. 4. 10. 6–685, *b*). Skull and skin. Brazil.
*Purchased* (*Brandt*), 1846.

47. 11. 22. 21. Skull, with antlers, and skin. Santa Cruz de la Sierra, Bolivia; collected by Mr. T. Bridges.
*Purchased*, 1847.

47. 11. 22. 21*. Skin, immature. Same locality and collector. *Same history.*

58. 6. 18. 7. Skin, female. Locality unknown.
*Purchased* (*Zoological Society*), 1858.

59. 9. 6. 106 (1037, *b*). Skull, young. Surinam, Dutch Guiana; Dr. A. Günther's collection. *Purchased*, 1859.

80. 5. 6. 40. Skin, female. Sarayacu, Ecuador; collected by C. Buckley, Esq. *Purchased*, 1880.

80. 5. 6. 41. Skin, immature. Same locality and collector.
*Same history.*

82. 9. 30. 26. Skull, with antlers. Taquara, Rio Grande do Sul, Brazil; collected by Dr. H. von Ihering.
*Purchased*, 1882.

82. 9. 30. 27. Skull, female. Same locality and collector.
*Same history.*

92. 11. 2. 3. Skin, young. Trinidad.
*Presented by H. Carracciolo, Esq.*, 1892.

97. 1. 5. 20. Skin. Medellin, Antioquia, Colombia;

* Fitzinger founded *Doratoceros* on account of the supposed absence of the tarsal gland, which is stated by Pocock to be present.

collected by Mr. J. K. Salmon; formerly in collection of Sir Victor Brooke, Bart.

*Presented by Sir Douglas Brooke, Bart.*, 1897.

3. 4. 6. 8. Skull and skin, young. Rupununi, southern British Guiana; collected by Dr. J. J. Quelch.

*Presented by F. V. McConnell, Esq.*, 1903.

4. 7. 4. 85. Skull, with antlers, and skin. Igarapé, Assu, Para, Amazonia; collected by Mr. A. Robert.

*Presented by O. Thomas, Esq.*, 1904.

4. 7. 4. 86. Skull, with antlers, and skin. Same locality and collector. *Same history.*

4. 7. 4. 87. Skull, with antlers, and skin. Same locality and collector. *Same history.*

8. 3. 7. 55. Skull, with antlers, and skin. Coast-region, Demerara, British Guiana.

*Presented by F. V. McConnell, Esq.*, 1908.

9. 4. 20. 3–4. Two young skulls and skins, the latter in the dark, white-spotted coat. Mazaruni Valley, British Guiana. *Same donor*, 1909.

12. 12. 19. 11. Skull and skin, female. Bonasica, Essequibo Valley, British Guiana; collected by Mr. Cozier.

*Same donor*, 1912.

12. 12. 19. 12. Skull and skin, female. Same locality and collector. *Same history.*

13. 5. 23. 12. Skull, with antlers, and skin. Same locality and collector. *Same donor*, 1913.

13. 12. 18. 4. Skull and skin, female. Gumunda, Lower Amazonia. *Presented by the Goeldi Museum, Para*, 1913.

13. 12. 18. 5. Skull and skin, young female. Same locality. *Same history.*

13. 12. 18. 6. Skull and skin. Ceara, Amazonia.

*Same history.*

## B.—Mazama simplicicornis mexianæ.

Coassus simplicicornis, *var.* mexianæ, *Hagmann, Archiv Rassen- und Gesell. Biol.* vol. v, p. 14, pl. i, 1908.

Typical (and only) locality Mexiana Island, mouth of the Amazon.

Smaller than typical race, the skull having a basal length

of from 150 to 163 mm., against from 173 to 181 mm. in the latter; antlers and their pedicles less inclined backwards than in typical race, and a marked difference in the shape of the lachrymal.

No specimen in collection.

### C.—Mazama simplicicornis citus.

Mazama americana citus, *Osgood, Field Mus. Zool. Pub.* vol. x, p. 43, 1912.

Typical locality Lake Maracaibo, Venezuela.

Type in Field Museum, Chicago.

Similar to typical race, but slightly larger, with especially large cheek-teeth, and the colour greyer and paler.

No specimen in collection.

## IX. MAZAMA TSCHUDII.

Cervus (Subulo) tschudii, *Wagner, Schreber's Säugthiere, Suppl.* vol. v, p. 386, 1855.

Cervus (Subulo) simplicornis major, *Wagner, loc. cit.* 1855.

Doryceros tschudii, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 360, 1873, vol. lxxix, pt. 1, p. 30, 1879.

Coassus whitelyi, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. xii, p. 163, 1873, *Hand-List Ruminants Brit. Mus.* p. 162, pl. xxxii, 1873.

Cariacus whitelyi, *Brooke, Proc. Zool. Soc.* 1878, p. 926.

Mazama tschudii, *Lydekker, Deer of All Lands*, p. 305, 1898, *Great and Small Game of Europe, etc.* p. 373, 1901.

Typical locality Peru, at elevations of 16,000 feet above the sea-level on the western slopes of the coast Cordillera, in the same districts inhabited by *Hippocamelus antisensis.*

Closely allied to *M. simplicicornis,* from which it is distinguished by its somewhat inferior size, nearly smooth antlers, and certain details of coloration; back darker than in *M. simplicicornis,* and under-parts and inner sides of limbs white, instead of buffish white; hairs of back without subterminal yellowish red rings.

73. 6. 27. 2 (1618, *a*). Skull, immature female. Cosnipata, Peru; collected by Mr. H. Whitely. Type of *Cariacus whitelyi.* *Purchased,* 1873.

## X. MAZAMA PANDORA.

Mazama pandora, *Merriam, Proc. Biol. Soc. Washington*, vol. xiv, p. 105, 1901; *Elliot, Mamm. Mid. Amer. and W. Indies (Field Mus. Zool. Pub.* vol. iv), p. 80, 1904; *Miller, List N. Amer. Mamm.* p. 390, 1912.

Hippocamelus pandora, *Elliot, Check-List Mamm. N. Amer. and W. Indies (Field Mus. Zool. Pub.* vol. vi), p. 51, 1905; *Allen, Bull. Mus. Harvard Coll.* vol. 2, p. 108, 1906.

Typical locality Yucatan.

Type in U.S. National Museum, Washington.

Size and ears much the same as in *M. americana;* general colour greyish or drab brown; ears with a white line or margin near basal aperture; tail dull fulvous above.

No specimen in collection.

## XI. MAZAMA NANA.

Cariacus nanus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 173, 1842.

Cervus (Subulo) nanus, *Wagner, Schreber's Säugthiere, Suppl.* vol. v, p. 386, 1855.

Nanelaphus namby, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 361, 1873, vol. lxxix, pt. 1, p. 32, 1879.

Nanelaphus nambi, *Goeldi, Mammiferos do Brasil*, p. 108, 1893.

Cervus (Coassus) nanus, *Ihering, Mammiferos de São Paulo*, p. 16, 1894.

Mazama nana, *Lydekker, Deer of All Lands*, p. 305, 1898, *Great and Small Game of Europe, etc.* p. 373, 1901.

Type of *Nanelaphus.*

Typical locality Matto Grosso district, Brazil.

Imperfectly known; size very small, inferior to that of *M. simplicicornis,* from which this species is stated to be distinguished by the larger face-glands; tail terminating in a tuft of longish hairs; coat rough and thick; ears thickly haired externally, short-haired internally; general colour uniformly dark brown with a tinge of reddish; under-parts lighter; tail coloured like back above, white below and at tip; a small white spot beneath each eye; lips white, the upper one dirty white near muzzle; ears externally dark brown, internally bluish white; tarsal tuft white.

No specimen in collection.

INCERTÆ SEDIS.

1. Coassus auritus, *Gray, Proc. Zool. Soc.* 1850, p. 242, *Ann. Mag. Nat. Hist.* ser. 2, vol. ix, p. 432, 1852, *Cat. Ungulata Brit. Mus.* p. 239, 1852, *Cat. Ruminants Brit. Mus.* p. 92, 1872; nec Cervus auritus, *Desmarest.*

Cervus (Subulo) auritus, *Wagner, Schreber's Säugthiere, Suppl.* vol. v, p. 336, 1855.

Subulo auritus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 360, 1873, vol. lxxix, pt. 1, p. 19, 1879.

Mazama aurita, *Lydekker, Deer of All Lands*, p. 306, 1898.

Named from a Brazilian (?) skin, now lost; possibly the female of *M. americana.*

2. Mazama rondoni, *Ribeiro, Comm. Linhas Telegr. de Matto Grosso ao Amazonias, Annex 5, Hist. Nat., Mammiferos (Rio de Janeiro)*, p. 33, 1914.

Typified by a male skin and female skeleton from Poaya, Amazonia, in the Museum at Rio de Janeiro. Dimensions are given, and the colour is said to be dark, but the description is otherwise insufficient.

## XI. Genus PUDU.

Pudu, *Gray, Proc. Zool. Soc.* 1850, p. 242, *Cat. Ruminants Brit. Mus.* p. 92, 1872; *Pocock, Proc. Zool. Soc.* 1910, p. 967.

Nanelaphus, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 360, 1873, vol. lxxix, pt. 1, p. 31, 1879, partim.

Pudua, *Garrod, Proc. Zool. Soc.* 1877, p. 18; *Brooke, ibid.* 1878, p. 296; *de Winton, ibid.* 1896, p. 508; *Lydekker, Deer of All Lands*, p. 307, 1898.

Skull and metacarpals generally as in *Mazama;* size very small; coat coarse and brittle; antlers in the form of short, simple spikes; cannon-bones very short; tail short or wanting; hair of forehead either reversed or directed uniformly backwards from muzzle to crown; ears large and rounded; face-glands present or absent; naked portion of muzzle variable; tarsal, metatarsal and interdigital glands absent; upper canines wanting; external cuneiform of tarsus united with naviculo-cuboid.

The genus includes two species—one from the highlands of Chile and the other from those of Ecuador—severally

representing subgeneric groups, distinguished from one another as follows:—

A. Well developed face-glands and lachrymal pits; first lower incisor not markedly larger than second ..... *Pudu.*

B. Face-glands and lachrymal pits wanting; first lower incisor much larger than second ..... *Pudella.*

## 1. Subgenus **PUDU.**

Face-glands and lachrymal pits (fig. 32) well developed; first lower incisor not markedly larger than second; premaxillæ not reaching nasals; muffle small; hoofs normal.

### I. PUDU PUDU.

Capra pudu, *Molina, Saggia Storia Nat. Chili*, p. 310, 1782.

Cervus humilis, *Bennett, Proc. Zool. Soc.* 1831, p. 27.

Cervus (Pudu) humilis, *Gray, Proc. Zool. Soc.* 1850, p. 242.

Pudu humilis, *Gray, Cat. Ungulata Brit. Mus.* p. 240, 1852, *Proc. Zool. Soc.* 1864, p. 105, *Cat. Ruminants Brit. Mus.* p. 93, 1872, *Hand-List Ruminants Brit. Mus.* p. 163, 1873.

Pudu chilensis, *Gray, Cat. Ungulata Brit. Mus.* pl. xxxvi, 1852.

Cervus pudu, *Sclater, Proc. Zool. Soc.* 1871, p. 238.

Nanelaphus pudu, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii. pt. 1, p. 361, 1873, vol. lxxix, pt. 1, p. 34, 1879.

Pudua humilis, *Garrod, Proc. Zool. Soc.* 1877, p. 18; *Brooke, ibid.* 1878, p. 927; *de Winton, ibid.* 1896, p. 510; *Sclater, List Anim. Zool. Gardens*, p. 174, 1883; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 325, 1884; *Flower and Lydekker, Study of Mammals*, p. 330, 1891.

Coassus humilis, *Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 31, 1881.

Pudua pudu, *Lydekker, Deer of All Lands*, p. 307, 1898, *Great and Small Game of Europe, etc.* p. 373, 1901.

Pudu pudu, *Pocock, Proc. Zool. Soc.* 1910, p. 967; *Thomas, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 588, 1913.

Pudu.

Typical locality Chilian Andes.

Size very small—shoulder-height about 13½ inches; hair reversed from a line running transversely across forehead in front of ears; tail short and bushy; general colour speckled grey-fawn, passing into bright chestnut on hinder two-thirds of back; ears, lips, a patch above each eye, two areas of variable size on forehead, fronts of fore-legs from knees

downwards, and greater part of hind-legs bright chestnut; under-parts rufous yellow.

The range includes the Chilian Andes and thence southwards to the Chiloë Archipelago.

50. 11. 29. 5–6 (972, *b*). Skull and skin, female. Chile. *Purchased* (*Zoological Society*), 1856.

54. 12. 6. 6. Skin, mounted, female. Chile. *Same history*, 1854.

55. 12. 24. 284. Skin, female. Chile. Type. *Same history*, 1855.

Fig. 32.—Skull of Pudu (*Pudu pudu*).

75. 4. 10. 3–4 (972, *b*). Skin and mounted skeleton. Chile. *Same history*, 1875.

1. 9. 25. 2. Skull and skin, female. Belind, Constitucion, Chile. *Presented by J. A. Wolffsohn, Esq.*, 1901.

1. 11. 30. 1. Skull, with antlers, and skin. Concepcion. *Presented by S. H. H. Henn, Esq.*, 1901.

3. 11. 16. 1. Skin, immature, mounted. Chilian Andes. *Presented by the Duke of Bedford, K.G.*, 1903.

5. 2. 4. 20. Skull and skin, female. Temuco, southern Chile; collected by Mr. D. S. Bullock. *Purchased*, 1905.

10. 8. 11. 12. Skull, with antlers, and skin. Same locality and collector. *Purchased*, 1910.

## 2. Subgenus **PUDELLA.**

Pudella, *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 588, 1913.

Face-glands and lachrymal pits wanting; first lower incisors much larger than second; premaxillæ reaching nasals; muffle large, extending backwards in middle line a considerable distance behind nostrils.

### II. PUDU (PUDELLA) MEPHISTOPHILES.

Pudua mephistophiles, *de Winton*, *Proc. Zool. Soc.* 1896, p. 508, pl. xix, partim; *Lydekker*, *Deer of All Lands*, p. 308, pl. xxiv, fig. 1, *Great and Small Game of Europe, etc.* p. 374, 1901; *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. i, p. 350, 1908; *Lönnberg*, *Arkiv Zool.* vol. viii, no. 16, p. 33, 1913.

Pudella mephistophiles, *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 588, 1913.

Typical locality Paramo of Papallacta, Ecuador.

Size probably rather larger than in *P. pudu*—shoulder-height about 14 or 15 inches; coat long and coarse, with basal portion of hairs brittle and pith-like, the terminal halves black with ferruginous tips, producing a rich brown colour; back darker than flanks, owing to the hairs having broader black bands with correspondingly reduced coloured tips, on neck the tips paler and longer, the black being reduced, producing a tawny appearance, but towards the head the black increasing, till the shorter hairs of ears, face, and chin are almost black; ears very short, partially concealed by rough hairs, thickly haired inside and out, the hairs on the inside broadly tipped with white; feet black, with most of the hairs minutely tipped with buff; inner sides of legs and abdomen clothed with long yellowish hairs of a finer type.

For skull, *vide* Thomas, *op. cit.*, 1908.

96. 1. 28. 5. Skin, immature female. Paramo of Papallacta, Ecuador. Type.

*Presented by L. Söderström, Esq.*, 1896.

99. 2. 18. 20–21. Two skulls and skins. Ecuador.

*Same donor*, 1899.

## XII. Genus CAPREOLUS.

Capreolus, *Gray*, *Med. Repos.* vol. xv, p. 307, 1821; *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 313, 1827; *Brooke*, *Proc. Zool. Soc.* 1878, p. 917; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. viii, p. 41, 1881; *Lydekker*, *Deer of All Lands*, p. 223, 1898; *Pocock*, *Proc. Zool. Soc.* 1910, p. 957; *Miller*, *Cat. Mamm. West. Europe*, p. 972, 1912.

Caprea, *Ogilby*, *Proc. Zool. Soc.* 1836, p. 135.

Lateral metacarpals as in *Odocoilcus;* vomer not dividing aperture of posterior nares; a pouch-like gland opening by a narrow orifice on front of hind-pasterns; antlers comparatively small, rising close together and almost vertically from the crown of the head, with the beam dichotomously forking at a point about two-thirds of the total length, and the posterior, or upper prong of this fork, which is the larger, again dividing, the normal number of tines being three; muzzle with a large naked portion, extending between the nostrils, the upper border of which is straight, while the part below the nostrils is narrow; ears large; tail rudimentary; face short, with the muzzle blunt; coat uniformly coloured, typically with a white patch in the region of the tail in winter; a metatarsal gland on the upper half of the metatarsus; lachrymal pits small and shallow and the face-glands obsolete; lateral hoofs well developed; upper canines usually wanting; upper molars tall-crowned, without a distinct additional column on inner side. Young spotted. Size medium or rather small; build tall. On the under surface of the skull the auditory bullæ are not markedly inflated, and the unossified vacuities near the lachrymal-pits form narrow slits.

The range includes Central and Southern Europe from Great Britain and Scandinavia eastwards, and thence across Asia north of the Himalaya to the Pacific coast.

The species are distinguishable by the following characters:—

A. Size smaller; ears narrow, pointed, and thinly haired; antlers moderately thick and rugose.

*a*. Size smaller; summer and winter coats markedly different in colour; dark moustache-marks on lips; ears red or grey externally; teeth short-crowned..... *C. capreolus.*

*b*. Size rather larger; summer and winter coats less different in colour; no dark marks on lips; ears blackish or black externally; teeth tall-crowned. *C. bedfordi*.

B. Size larger; ears broad, blunt, and thickly haired; antlers very thick and rugose..... *C. pygargus*.

## I. CAPREOLUS CAPREOLUS.

Cervus capreolus, *Linn.*, *Syst. Nat.* ed. 10, vol. i, p. 68, 1758, ed. 12, vol. i, p. 94, 1766; *Schreber*, *Säugthiere*, pls. 212, *A* and *B*, 1781; *Kerr*, *Linn.'s Anim. Kingdom*, p. 302, 1792; *Cuvier*, *Ossemens Fossiles*, ed. 2, vol. iv, p. 47, 1823; *F. Cuvier*, *Hist. Nat. Mamm.* vol. ii, pls. 226–228, 1823; *H. Smith*, *Griffith's Animal Kingdom*, vol. iv, p. 124, 1827; *J. B. Fischer*, *Synop. Mamm.* p. 450, 1829; *Jenyns*, *Brit. Vert. Anim.* p. 35, 1835; *Bell*, *Brit. Quadrupeds*, p. 407, 1837; *Lesson*, *Nouv. Tabl. Règne Anim.*, *Mamm.* p. 172, 1842; *Owen*, *Rep. Brit. Assoc.* 1843, p. 238, 1844, *Brit. Foss. Mamm. and Birds*, p. 487, 1846; *Kölliker*, *Würzburg. Naturwiss. Zeitschr.* vol. vi, p. 82; 1866; *Radde*, *Säugeth. Talysch.* p. 10, 1866; *Winge*, *Danmarks Fauna*, *Pattedyr*, p. 169, 1908.

Cervus capreolus albus, *Kerr*, *Linn.'s Anim. Kingdom*, p. 302, 1792.

Cervus (Capreolus) capreolus, *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 314, 1827; *Matschie*, *Beröff. Inst. Jagdkunde*, vol. ii, p. 141, 1913.

Capreolus dorcas, *Burnett*, *Quart. Journ. Sci. Lit. and Art*, 1829, p. 353, nom. nudum; *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 171, pl. xv, 1835.

Capreolus fossilis, *Meyer*, *Palæologica*, p. 95, 1832.

Capreolus vulgaris, *Fitzinger*, *Beitr. Landesk. Österreichs*, vol. i, p. 317, 1832, *Wissensch.-pop. Naturgesch. Säugeth.* vol. iv, p. 192, 1860, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 353, 1873, vol. lxx, pt. 1, p. 239, 1874; *Ménétries*, *Cat. raison. Zool. Caucas.* p. 1, 1887; *Lydekker*, *Deer of All Lands*, p. 224, pl. xviii, 1898, *Great and Small Game of Europe*, p. 247, 1901.

Capreolus capræa, *Gray*, *List Mamm. Brit. Mus.* p. 176, 1843, *Proc. Zool. Soc.* 1850, p. 235, *Cat. Ungulata Brit. Mus.* p. 222, 1852, *Cat. Ruminants Brit. Mus.* p. 81, 1872, *Hand-List Ruminants Brit. Mus.* p. 153, 1873; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 265, 1862; *Blanford*, *Eastern Persia*, vol. ii, p. 96, 1876; *Brooke*, *Proc. Zool. Soc.* 1878, p. 917; *Danford and Alston*, *ibid.* 1880, p. 55; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 187, 1891; *Satunin*, *Mitt. Kaukas. Mus.* vol. i, p. 62, 1901.

Cervus capreolus plumbeus, *Reichenbach*, *Säugethiere*, vol. iii, pl. iii bis, 1845.

Capreolus europæus, *Sundevall*, *K. Svenska Vet.-Ak. Handl.* 1844, p. 184, 1846.

Capreolus capreolus, *Blasius*, *Säugeth. Deutschlands*, p. 457, 1857; *Nitsche*, *Studien über Hirsche*, pl. iv, 1898; *Satunin*, *Mitt. Kaukas. Mus.* vol. ii, pp. 211 and 359, 1906; *Millais*, *Mamm. Gt. Britain*, vol. iii, p. 137, 1906; *Pocock*, *Proc. Zool. Soc.* 1910, p. 957; *Trouessart*, *Faune Mamm. Europe*, p. 233, 1910; *Miller*, *Cat. Mamm. West. Europe*, p. 974, 1912.

Capreolus vulgaris niger et C. v. varius, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxx, pt. 1, p. 247, 1874.

Capreolus caprea, *Bell*, *Brit. Quadrupeds*, ed. 2, p. 262, 1874; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 318, 1884; *Flower and Lydekker*, *Study of Mammals*, p. 327, 1891; *Lydekker*, *Horns and Hoofs*, p. 325, 1893, *Brit. Mamm.* p. 249, 1895; *Ward*, *Records of Big Game*, ed. 2, p. 53, 1896, ed. 6, p. 92, 1910, ed. 7, p. 92, 1914; *Satunin*, *Zool. Jahrb.*, *Syst.* vol. ix, p. 310, 1896; *Hennicke*, *Zool. Garten*, vol. xli, p. 379, 1900; *Keibel*, *Verh. Anat. Ges.* vol. xvii, p. 184, 1901; *Zimmermann*, *Zool. Jahrb.*, *Syst.* vol. xxii, p. 1, 1905.

Cervulus capreolus, *Satunin*, *Mitt. Kaukas. Mus.* vol. vii, pp. 20 and 41, 1912, errorim.

Roe, or Roebuck.

Typical locality Sweden.

Size small (shoulder-height 26 to 27 inches, basal length of skull from about 6 to 6¼ inches); ears narrow, uniformly

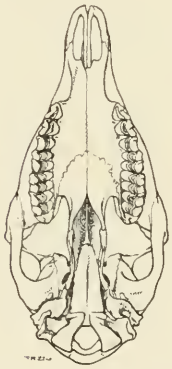


Fig. 33.—Palatal Aspect of Skull of Roe (*Capreolus capreolus*). ¼ nat. size.

From Miller, *Cat. Mamm. Western Europe.*

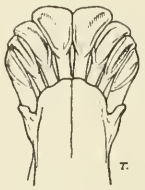


Fig. 34.—Lower Front Teeth of Roe (*Capreolus capreolus*). nat. size.

From Miller, *Cat. Mamm. Western Europe.*

greyish externally; antlers moderately thick and rugose; cheek-teeth short-crowned; summer and winter coats differing markedly in colour, the former foxy red, the latter olive-grey or grey with a conspicuous white rump-patch; lips and sides of muzzle with a black moustache-mark, but front of muzzle, on each side of muffle, and chin white.

The distributional area extends from the British Islands to the Caucasus and some part of Western Asia, and from Scotland and Sweden southwards to Spain and other countries

on the north side of the Mediterranean. Fine antlers measure from about 11 to 13 inches, with a basal girth of from 3 to 7 inches, and a tip-to-tip interval of from $4\frac{1}{2}$ to $14\frac{1}{2}$ inches.

The races may be distinguished as follows:—

A. General colour of face darker than that of body ..... *C. c. thotti.*

B. General colour of face not darker than that of body.

*a*. Light throat-patch and neck-patch whitish and sharply defined in winter ..... *C. c. transsylvanicus.*

*b*. Light throat-patch and neck-patch yellowish or greyish and ill-defined in winter.

*a'*. General colour in winter with a distinct yellowish tinge ..... *C. c. capreolus.*

*b'*. General colour in winter coarsely grizzled grey, without a yellowish tinge ... *C. c. canus.*

### A.—Capreolus capreolus capreolus.

Capreolus capreolus capreolus, *Miller, Cat. Mamm. West. Europe*, p. 274, 1912.

Including:—

Capreolus rhenanus, *Weidwerk in Wort u. Bild*, vol. xix, p. 263, 1900, warthæ (Warthe Valley), *Deutsch. Jäger-Zeitung*, vol. lviii, p. 801, 1912, *Matschie.*

Cervus (Capreolus) capreolus balticus (Baltic Provinces), *Bericht achtzen. Deutsche Geweih-Austellung*, 1912, p. 861, [c.] cistaunicus (North of Taunus Range), p. 141, c. transvosagicus (Up. Mosel Valley), p. 142, c. albicus (Silesia), p. 144, *Beröff Inst. Jagdkunde*, vol. ii, 1913, *Matschie.*

Typical locality Sweden; the range is taken to include all Europe except the areas occupied by the under-mentioned races.

Light throat-patch indistinct; general colour in winter distinctly tinged with yellow.

* * * *. Skin, mounted. France. *No history.*

59. 9. 6. 107–109. Three skulls, with antlers. South Germany; collected by Dr. A. Günther. *Purchased*, 1859.

67. 4. 12. 225–231. Seven skulls, with antlers. Localities unknown. *Lidth de Jeude Collection, purchased*, 1867.

76. 5. 4. 1. Skin, melanistic, mounted. Westphalia. *Purchased (Gerrard)*, 1876.

76. 5. 4. 2. Skin, female. Westphalia. *Same history.*

76. 5. 4. 3. Skull and antlers. Westphalia.
*Same history.*

98. 10. 12. 1. Head, mounted. Austria.*
*Presented by Lieut.-Col. R. W. Shipway*, 1898.

10. 10. 18. 1. Skull and skin, female. Skabersjö, Sweden. *Presented by Dr. Einar Lönnberg*, 1910.

10. 11. 17. 1. Skull and skin. Ferrières, Seine-et-Marne, France. *Presented by the Hon. N. C. Rothschild*, 1910.

11. 11. 18. 1. Skull and skin. Same locality.
*Same donor*, 1911.

12. 1. 17. 1. Skull and skin, female. Same locality.
*Same donor*, 1912.

11. 12. 5. 1. Skull and skin. Armandvilliers, Seine-et-Marne. *Same donor*, 1911.

11. 9. 13. 1–15. Fifteen pairs of antlers, on frontlets. Bavaria. *Presented by F. N. A. Fleischmann, Esq.*, 1911.

## B.—Capreolus capreolus transsylvanicus.

Capreolus transsylvanicus, *Matschie, Weidwerk in Wort u. Bild*, vol. xvi, p. 224, 1907.

Capreolus capreolus transsylvanicus, *Miller, Cat. Mamm. West. Europe*, p. 975, 1912.

Typical locality, Bana, Rumania.

Light throat-patch distinct; general colour in winter clear grizzled grey.

The distributional area extends from eastern Europe, and perhaps Asia Minor, to the Italian Alps.

9. 1. 18. 3–4. Two skulls and skins, female. Padola, Cadore, Venetian Alps.
*By exchange with the Turin Museum*, 1909.

10. 12. 4. 1. Two skulls and skins, female. Csehtelek, Bihar Comitat, Hungary.
*Presented by the Hon. Mrs. N. C. Rothschild*, 1910.

* May belong to *C. c. transsylvanicus.*

## C.—Capreolus capreolus canus.

Capreolus capreolus canus, *Miller*, *Ann. Mag. Nat. Hist.* ser. 8, vol. vi, p. 460, 1910, *Cat. Mamm. West. Europe*, p. 975, 1912; *Cabrera*, *Cat. Met. Mam. Mus. Madrid*, p. 130, 1912.

Typical locality Quintanar de la Sierra, Burgos, Spain, to which country and Portugal this race is restricted.

Light throat-patch as in typical race, but general colour coarsely grizzled grey, without a yellowish tinge.

8. 7. 7. 27–29. Three skulls, with antlers, and skins. Pinares de Quintanar de la Sierra; collected by Señores S. and N. Gonzalez. No. 8. 7. 7. 28 is the type of the subspecies. *Purchased*, 1908.

8. 7. 7. 30–31. Two skulls and skin, females. Same locality and collectors. *Same history.*

## D.—Capreolus capreolus thotti.

Capreolus capreolus thotti, *Lönnberg*, *Ann. Mag. Nat. Hist.* ser. 8, vol. vi, p. 297, 1910; *Miller*, *Cat. Mamm. West. Europe*, p. 957, 1912.

Differs from typical race by darker general colour, especially on the face, which is darker than the body.

Typical locality Morayshire, Scotland; the subspecies is restricted to the British Isles.

60, *k*. Skin, mounted. Scotland.
*Presented by the Earl of Derby, about* 1844.

688, *a* and *b*. Two frontlets, with antlers. Scotland.
*No history.*

688, *d*. Frontlet and antlers. Scotland.
*Bequeathed by Gen. T. Hardwicke*, 1835.

85. 10. 6. 1. Skeleton. Nairn, Scotland.
*Presented by Earl Cawdor*, 1885.

85. 10. 6. 2. Skull, female. Same locality.
*Same history.*

93. 1. 8. 1. Head, mounted. Same locality.
*Same donor*, 1893.

97. 8. 21. 1. Skin, mounted. Whatcombe, Blandford, Dorsetshire. *Presented by J. C. Mansel-Pleydell, Esq.*, 1897.

97. 12. 11. 2. Skin, mounted. England.
*Purchased* (*Ward*), 1897.

7. 6. 6. 1. Head, mounted. Poltalloch, Argyllshire.
*Presented by Col. E. D. Malcolm*, 1907.

7. 6. 6. 2. Head, female, mounted. Same locality.
*Same history.*

8. 8. 18. 1. Skull, with antlers, and skin. Nairn.
*Presented by Earl Cawdor*, 1908.

8. 8. 18. 2. Skull and skin, female. Nairn.
*Same history.*

8. 11. 22. 1. Skull, with antlers, and skin. Arndilly, Craig Ellachie, Morayshire. Type.
*Presented by W. S. Menzies, Esq.*, 1908.

8. 11. 22. 2. Skull and skin, female. Same locality.
*Same history.*

11. 2. 22. 1. Skull, with antlers, and skin. Thornhill, Dumfriesshire. *Presented by H. S. Gladstone, Esq.*, 1911.

11. 2. 22. 2. Skull and skin, female. Same locality.
*Same history.*

13. 1. 8. 1. Skull, with antlers, and head-skin. Fortrose, Ross-shire, Scotland.
*Presented by W. R. Ogilvie-Grant, Esq.*, 1913.

## II. CAPREOLUS BEDFORDI.

Cervus pygargus mantschuricus, *Noack*, *Humboldt*, vol. viii, p. 9, fig. 12, 1889, *nec* Cervus mantchuricus, *Swinhoe*, 1864; *Allen and Andrews*, *Bull. Amer. Mus. Nat. Hist.* vol. xxxii, p. 488, 1913.

Capreolus manchuricus, *Lydekker*, *Deer of All Lands*, p. 231, 1898, *Great and Small Game of Europe*, *etc.* p. 255, 1901.

Capreolus bedfordi, *Thomas*, *Proc. Zool. Soc.* 1908, p. 645, pl. xxxii, *Abstr. P.Z.S.* 1908, p. 32; *Miller*, *Proc. Biol. Soc. Washington*, vol. xxiv, p. 231, 1911.

Typical locality Manchuria.

Size slightly larger than in typical species; antlers relatively small; cheek-teeth comparatively high-crowned, and skull rather larger than in *C. capreolus;* summer and winter coats not so markedly different in colour as in the latter, the general tint in winter being buffish clay-colour; no moustache-marks on upper lips; ears blackish grey or black externally.

The range includes Shan-si, Kan-su, and Korea.

The two races are distinguishable as follows :—

A. General colour in summer not markedly reddish; backs of ears blackish..... *C. b. bedfordi.*
B. General colour in summer more distinctly red; backs of ear black..... *C. b. melanotis.*

## A.—Capreolus bedfordi bedfordi.

General colour in summer not markedly reddish, and backs of ears blackish, not contrasting strongly with general colour.

Typical locality Manchuria; the range includes Shan-si.

97. 10. 3. 57. Skin, female. Korea; collected by Mr. J. Kalinowski. *Purchased*, 1897.

99. 1. 7. 1. Head, immature, mounted. Manchuria. *Presented by the Duke of Bedford, K.G.*, 1899.

8. 8. 7. 97–98. Two skulls, with antlers. One hundred miles north-west of Tai-Yuen-Fu, Shan-si, N.E. China; collected by M. P. Anderson, Esq., November, 1907. Noticed by Thomas, *Proc. Zool. Soc.*, 1908, p. 645. *Same donor*, 1908.

8. 8. 7. 99. Skull and skin, female in winter coat. Same locality and collector. Type of species; figured by Thomas, *op. cit.*, pl. xxxii. *Same history.*

10. 5. 1. 92. Skin, female. Khinghan Mountains, Manchuria. *Purchased*, 1910.

10. 5. 1. 93. Skull and skin, young female. Same locality. *Same history.*

10. 5. 1. 94. Skull, with antlers, and skin, immature. Same locality. *Same history.*

## B.—Capreolus bedfordi melanotis.

Capreolus melanotis, *Miller*, *Proc. Biol. Soc. Washington*, vol. xxiv, p. 231, 1911.

Typical locality Kan-su, western China.

Type in U.S. National Museum, Washington.

General colour (of female) in summer more distinctly reddish than in typical race, and backs of ears deep black, contrasting strongly with general colour. Males in winter are grizzled grey, with more or less pronounced black tips to the ears.

11. 2. 1. 259–261. Three skulls, with antlers, and skins (in winter coat). S.E. of Min-chou, Kan-su; collected by M. P. Anderson, Esq.

*Presented by the Duke of Bedford, K.G.*, 1911.

11. 2. 1. 262–264 Three skulls and skins (in winter coat), female. Same locality and collector. *Same history.*

11. 6. 1. 61. Skin, female (winter). Feng-hasang-fu, Shen-si; same collector. *Same history.*

11 6. 1. 65. Skin (winter). Same locality and collector. *Same history.*

11. 6. 1. 66. Skull and skin (winter), female. Same locality and collector. *Same history.*

## III. CAPREOLUS PYGARGUS.

Cervus pygargus, *Pallas, Reise Russl.* vol. i, p. 97, 1777; *Schreber, Säugthiere*, vol. iv, p. 1118, pl. 253, 1784; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 122, 1827; *Noack, Humboldt*, vol. viii, p. 7, 1889.

Cervus ahu, *Gmelin, Reise Russl.* vol. iii, p. 496, 1780.

Cervus (Capreolus) pygargus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 314, 1827.

Capreolus pygargus, *Gray, Ann. Mag. Nat. Hist.* ser. 1, vol. v, p. 224, 1837, *List Mamm. Brit. Mus.* p. 176, 1843, *Proc. Zool. Soc.* 1850, p. 236, *Cat. Ungulata Brit. Mus.* p. 223, 1852, *Cat. Ruminants Brit. Mus.* p. 82, 1872, *Hand-List Ruminants Brit. Mus.* p. 154, 1873; *Gloger, Handbuch Naturgesch.* p. 141, 1841; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 353, 1873, vol. lxx, pt. 1, p. 248, 1874; *Brooke, Proc. Zool. Soc.* 1878, p. 917; *Lydekker, Horns and Hoofs*, p. 325, 1893, *Deer of All Lands*, p. 227, 1898, *Great and Small Game of Europe, etc.* p. 256, 1901; *Satunin, Zool. Jahrb., Syst.* vol. ix, p. 310, 1896, *Mitt. Kaukas. Mus.* vol. iii, p. 49, 1907; *Rasewig, Semja ochotu.* 1908, p. 509; *Bentham, Asiat. Horns and Antlers Ind. Mus.* p. 96, 1908; *Thomas, Proc. Zool. Soc.* 1908, p. 645; *Ward, Records of Big Game*, ed. 6, p. 94, 1910, ed. 7, p. 92, 1914; *Allen and Andrews, Bull. Amer. Mus. Nat. Hist.* vol. xxxii, p. 488, 1913; *Hollister, Proc. U.S. Nat. Mus.* vol. xlv, p. 525, 1913.

Ahu (Persian); Siberian Roe.

Typical locality the Semiretshinsk Altai.

Size considerably larger than in the typical species, the shoulder-height ranging from about 28 to 34 inches; ears relatively shorter, wider, less pointed, and more thickly haired, both externally and internally; antlers larger, more divergent, and more rugose on the inner border, where they

form a series of small irregular, nodular snags; winter coat thicker and rougher, being shaggy on the sides and lower portion of the head, chest, and under-parts; back, which is coloured a mixture of yellowish and greyish brown, more distinctly speckled with blackish, and the white rump-patch extending in a short V on to the flanks; in summer the coat a brighter and lighter rufous, with the hairs lying more smoothly, when first donned showing little or no signs of a light rump-patch, but a yellowish white disk gradually developing in this region as the season advances, apparently by fading; face-markings generally similar to those of the European species.

The range extends, in suitable localities, from the mountains of Russian Turkestan and the Altai to Siberia; and probably includes the mountains of the Caspian provinces of Persia; in Siberia not extending so far north as the range of some species of *Cervus*, the northern limit being about the 53rd or 54th parallel of latitude, and not ranging so far as the mouth of the Amur river. During winter the species migrate south into Manchuria, and apparently Korea.

A complete "key" to the races cannot yet be given.

### A.—Capreolus pygargus firghanicus.

Capreolus pygargus firghanicus, *Rasewig*, *Semja ochotn.* 1909, p. 160.

Typical locality Ferghana district of Russian Turkestan.

The original description not accessible to writer.

No specimen in collection.

### B.—Capreolus pygargus pygargus.

Typical locality the Semiretshinsk Altai.

General characters those of the species; antlers comparatively simple, with a maximum recorded length of 15½ inches.

42. 3. 13. 1. Skin, formerly mounted. Siberia.
*Purchased* (*Brandt*), 1842.

42. 3. 13. 2. Skin, female, originally mounted. Siberia.
*Same history.*

78. 12. 21. 28 (1701, *a*). Pair of antlers. Salair, Altai; collected by Dr. O. Finsch. *By exchange with the Geographical Society of Bremen*, 1878.

78. 12. 21. 29 (1701, *b*). Pair of antlers, in velvet. Same locality and collector. *Same history.*

87. 6. 3. 1. Frontlet and antlers. Southern Manchuria. *Presented by H. E. M. James, Esq.*, 1887.

95. 3. 12. 1. Skull, immature female. Amurland. *Presented by J. Rowland Ward, Esq.*, 1895.

98. 12. 15. 2–3. Two frontlets, with antlers. Semiretshinsk, Altai. *Presented by H. J. Elwes, Esq.*, 1898.

0. 3. 26. 4–5. Two skulls, with antlers, and skins. Altai. *Presented by the Hon. Walter Rothschild*, 1900.

0. 6. 9. 1. Skin (in winter coat), mounted. Altai. *Purchased*, 1910.

### C.—Capreolus pygargus tianschanicus.

Capreolus tianschanicus, *Satunin, Zool. Anz.* vol. xxx, p. 527, 1906.
Capreolus pygargus tianshanicus, *Ward, Records of Big Game*, ed. 6, p. 94, 1910, ed. 7, p. 94, 1914.

Typical locality Tien-shan.

Antlers more massive and more branched than those of the typical race, from which they also differ somewhat in shape; in one phase they diverge widely, and carry four or five tines on each side, but in a second the degree of divergence and the number of tines are less. The maximum recorded length of antler is $17\frac{3}{4}$ inches.

5. 3. 21. 2. Skull, with antlers, and scalp-skin. Khan Tengri, Tien-shan.

*Presented by Lord Edward Beauclerk*, 1905.

13. 2. 6. 3. Body-skin. Kulja, Tien-shan.

*Presented by Col. J. H. Abbot Anderson*, 1913.

## XIII. Genus ALCES.

Alces, *Gray, Med. Repos.* vol. xv, p. 307, 1821, *List Mamm. Brit. Mus.* p. 182, 1843; *Brooke, Proc. Zool. Soc.* 1878, p. 915; *Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 54, 1381; *Lydekker, Deer of All Lands*, p. 49, 1898; *Miller, Cat. Mamm. West. Europe*, p. 977, 1912.

Alce, *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 72, vol. v, p. 303, 1827; *Pocock, Proc. Zool. Soc.* 1910, p. 958; *Miller, Proc. Boston Soc.* vol. xxviii, p. 40, 1897; nec *Blumenbach*,* 1799.

Alcelaphus, *Gloger, Handbuch Naturgeschichte*, p. 143, 1841; nec *Blainville*, 1816.

Paralces, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 160, 1902.

The geographical range includes the afforested northern portions of both eastern and western hemispheres, extending in the Old World westwards to Norway, southwards to Eastern Germany, and eastwards to Central Russia and Eastern Siberia.

Lateral metacarpals as in *Mazama;* vomer not dividing aperture of posterior nostrils; hind-pasterns with a relatively small glandular invagination, situated as in *Capreolus;* antlers (fig. 36) present only in males (as in all the preceding genera), situated low down on the skull, from which they arise at right-angles to the median longitudinal line, extending at first directly outwards in the plane of the forehead, and, in their fullest development, expanding into a broad palmation margined with snags, in structure essentially dichotomous, with the upper main branch much superior in size to the lower; muzzle broad, long, and overhanging, with a very small triangular naked area between the lower angles of the nostrils; head and limbs long; neck and body short; tail very short; main hoofs narrow, long, and pointed, lateral hoofs large; usually small metatarsal glands situated high up on the shanks; tarsal glands and face-glands present; coat uniformly coloured at all ages and all seasons, long and coarse; males provided with a pear-shaped pendulous expansion of skin covered with long hairs on the throat. In the skull (fig. 35) the nasals very short, and the nasal aperture consequently of great extent; gland-pits and vacuities between the bones of the face moderate. Upper molar teeth broad, low-crowned and approximating to those of giraffes; upper canines wanting or rudimentary. Size very large, and build heavy.

The lower front teeth are shown in fig. 1, p. 2.

* *Handbuch Naturgesch.* ed. 6, p. 697; typified by the extinct *Cervus megaceros* or *Megaceros hibernicus*.

## ALCES ALCES.

Cervus alces, *Linn., Syst. Nat.* ed. 10, vol. i, p. 66, 1758, ed. 12, vol. i, p. 92, 1766; *Schreber, Säugthiere*, pl. 246, 1783; *F. Cuvier, Hist. Nat. Mamm.* vol. ii, pl. 222, 1823; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 72, 1827; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 169, 1829; *Caton, Antelope and Deer of America*, p. 69, 1877; *Nehring, Tundren und Steppen*, p. 107, 1890; *Nitsche, Zool. Anz.* vol. xiv, p. 181, 1891; *Wolley, Big Game Shooting* (*Badminton Libr.*), vol. i, p. 396, 1894.

Cervus alce, *Boddaert, Elenchus Anim.* vol. i, p. 135, 1785.

Cervus coronatus, *Lesson, Man. Mamm.* p. 356, 1827; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 95, 1827.

Cervus (Alce) alces, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 303, 1827.

Cervus (Alce) coronatus, *H. Smith, op. cit.* p. 304, 1827.

(?) Alces europæus, *Burnett, Quart. Journ. Sci. Lit. and Art*, 1829, p. 393.

Alces machlis, *Ogilby, Proc. Zool. Soc.* 1836, p. 135; *Gray, ibid.* 1850, p. 224; *Brooke, ibid.* 1878, p. 916; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 316, 1884; *Lydekker, Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 78, 1885, *Horns and Hoofs*, p. 319, 1893, *Deer of All Lands*, p. 52, pl. ii, 1898, *Great and Small Game of Europe, etc.* p. 42, 1901; *True, Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1885; *Flower and Lydekker, Study of Mammals*, p. 326, 1891; *Grevé, Zool. Garten*, vol. xxxv, p. 267, 1895; *Leverkus-Leverkusen, Verh. Ver. Rheinland*, vol. lviii, p. 11, 1902; *Newton, Quart. Journ. Geol. Soc.* vol. lix, p. 80, 1903; *Grant, Seventh Rep. Forest, Fish, and Game Commission*, p. 226, 1903; *Millais, British Mammals*, vol. iii, p. 8, 1906; *Winge, Danmark's Fauna, Pattedyr*, p. 177, 1908; *Ward, Records of Big Game*, ed. 6, p. 96, 1910, ed. 7, p. 96, 1914.

Alcelaphus alce, *Gloger, Handbuch Naturgeschichte*, p. 143, 1841.

Alces antiquorum, *Rüppell, Verzeichniss Mus. Senckenberg*, vol. iii, p. 183, 1842.

Alces palmatus, *Gray, List Mamm. Brit. Mus.* p. 182, 1843; *Blasius, Säugeth. Deutschl.* p. 434, 1857.

Alces alces, *Sundevall, K. Svenska Vet.-Ak. Handl.* 1844, p. 176, 1846; *Lönnberg, Proc. Zool. Soc.* 1902, vol. ii, p. 352, *Zool. Anz.* vol. xxviii, p. 448, 1905, *Zool. Studier*, vol. i, p 237, 1907; *Trouessart, Faune Mamm. Europe*, p. 270, 1910; *Kaponen, Luonnon Ystävä*, vol. xv, p. 206, 1911; *Miller, Cat. Mamm. West. Europe*, p. 978, 1912.

Alces malchis, *Gray, Knowsley Menagerie*, p. 56, 1850, *Cat. Ungulata Brit. Mus.* p. 186, 1852, *Cat. Ruminants Brit. Mus.* p. 66, 1872, *Hand-List Ruminants Brit. Mus.* p. 136, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 255, 1862.

Alces jubata, *Fitzinger, Naturgesch. Säugethiere*, vol. iv, p. 86, 1860, *Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 521, 1875.

Alce alces, *Gilpin, Mamm. Nova Scotia*, p. 119, 1871; *Pocock, Proc. Zool. Soc.* 1910, p. 958.

Alces lobata coronata, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix, pt. 1, p. 528, 1874.
Paralces alces, *Allen, Bull. Amer. Mus. Nat.* vol. xvi, p. 160, 1902.

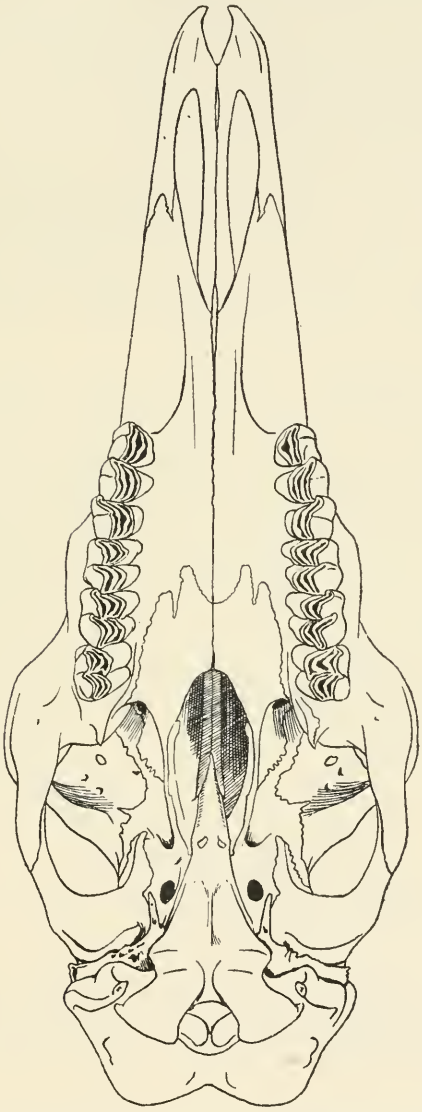


FIG. 35.—PALATAL ASPECT OF SKULL OF ELK (*Alces alces*). ¼ nat. size.
From Miller, *Cat. Mamm. Western Europe.*

Elk; Moose.

The distribution of this, the only species here recognised, is co-extensive with that of the genus.

Largest of living deer, the height at the withers ranging from about $5\frac{3}{4}$ to $6\frac{3}{4}$ feet. Antlers (fig. 36) with a short beam and the palmation frequently so developed as to obliterate almost all traces of the primitive form, with the exception of a remnant of the cleft of the first fork, in other cases the palmation comparatively slight or wanting; coat long, coarse, and rather brittle, longest about the neck; general colour varying from yellowish grey to deep blackish brown, with the shanks whitish, the forehead dark chestnut, and the face below the eyes nearly black, but reddish grey near the muzzle.

In winter the coat is darker than in summer, especially when first assumed, the colour gradually fading till the spring-change; it is only in animals of the second or third year that the winter coat attains its deepest sable, as it becomes gradually lighter each succeeding year, till in old males it is more or less grizzly.

The races may be provisionally distinguished as follows:—

A. Antlers either palmated or forked.
  *a*. Shanks light ..... *A. a. alces.*
  *b*. Shanks apparently dark; palmation of antlers somewhat different ..... *A. a. bedfordiæ.*
B. Antlers apparently always palmated.
  *a*. Size smaller; colour duller.
    *a'*. Muffle triangular ..... *A. a. americanus.*
    *b'*. Muffle T-shaped ..... *A. a. columbæ.*
  *b*. Size larger; colour richer ..... *A. a. gigas.*

## A.—Alces alces alces.

Alces machlis typicus, *Ward, Records of Big Game*, ed. 6, p. 99, 1910, ed. 7, p. 99, 1914.

Including:—

Alces machlis uralensis, *Matschie, Beröff. Instituts Jagdkunde*, vol. ii, p. 155, 1913 (South Urals).

Alces machlis meridionalis, *Matschie, op. cit.* p. 156, 1913 (Government of Samara, Russia).

Elk.

Typical locality Sweden.

Unless one or both of the two forms named by Matschie

are entitled to distinction, the range will include all northern Europe and extend some way into northern Asia.

The antlers may be either broadly palmated, or simply forked.

703, *c*. Head, mounted. Russia.

*Presented by E. Caley, Esq.*

703, *d*. Single antler. Udoholm, Sweden.

*Presented by the Earl of Selkirk.*

703, *e*. Antlers. Sweden. From a specimen formerly in the Leverian Museum (*Mus. Lev.* pl. viii, 1792); mentioned in Gray's 1843 list.

*Presented by the Council of the Royal College of Surgeons.*

58. 5. 4. 17. Skull, immature, female. Russia.

*Purchased* (*Zoological Society*), 1858.

82. 5. 25. 1. Skin, mounted. Swenigorod, near Moscow.

*Purchased* (*Holst*), 1882.

82. 5. 25. 2. Skin, female, mounted. Same locality.

*Same history.*

3. 11. 21. 1–5. Five frontlets, showing the palmated type of antlers at different ages. Sweden.

*Purchased*, 1903.

3. 11. 21. 6–7. Two frontlets with antlers of the forked type. Sweden. *Purchased*, 1903.

*Of the following specimens the localities are unknown, and their racial determination has consequently been found impracticable:—*

703, *a*. Five antlers. *No history.*

703, *b*. Single antler. *No history.*

703, *o*. Antlers, young and deformed.

*Presented by the Earl of Enniskillen.*

50. 11. 22. 72 (703, *h*). Skeleton.

*Purchased* (*Zoological Society*), 1850.

51. 11. 10. 3 (703, *i*). Skeleton, female.

*Same history*, 1851.

51. 11. 10. 4 (703, *q*). Skull and antlers. *Same history.*

51. 11. 10. 5 (703, *r*). Skull and antlers. *Same history.*

## B.—Alces alces bedfordiæ.

Alces bedfordiæ, *Lydekker*, *Proc. Zool. Soc.* 1902, vol. i, p. 109; *Rothschild*, *ibid.* vol. ii, p. 317; *Lönnberg*, *ibid.* p. 353; *Elwes*, *ibid.* 1903, vol. i, p. 147; *Millais*, *Field*, vol. cxviii, p. 113, 1911.

Alces machlis bedfordiæ, *Lydekker*, *A Trip to Pilawin*, p. 85, 1908; *Ward*, *Records of Big Game*, ed. 6, p. 100, 1910, ed. 7, p. 100, 1914; *Millais*, *Field*, vol. cxviii, p. 113, 1911.

(?) Alces machlis yakutskensis, *Millais*, *Field*, vol. cxviii. p. 113, 1911.

Typical locality Eastern (?) Siberia.

Typified by a specimen in which the antlers are of the forked, non-palmate type. In other specimens they are fully palmated, but apparently differ somewhat in form from those of European elk. The Yakutsk elk has the head and neck rich dark brown, and, in some instances at any rate, dark brown shanks.

2. 3. 11. 1. Frontlet and antlers. East (?) Siberia. Type. *Presented by J. Rowland Ward, Esq.*, 1902.

* * * *. Frontlet and antlers. East Siberia. *No history.*

## C.—Alces alces americanus.

Cervus americanus, *Clinton*, *Letters on Nat. Hist. etc.* p. 193, 1822; nec *Erxleben*, 1777, *vide supra*, p. 155.

Alces americanus, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. iii, p. 125. pl. v, 1835; *Merriek*, *Mamm. Minnesota*, p. 270, 1892; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 38, 1901; *Osgood*, *Proc. Biol. Soc. Washington*, vol. xv, p. 87, 1902; *Grant*, *7th Rep. Forest, Fish, and Game Commission*, p. 226, 1903; *Stone and Cram*, *American Mammals*, p. 43, 1903; *Brooks*, *Rep. New York Zool. Soc.* vol. x, p. 201, 1906; *Miller*, *List N. Amer. Mamm.* p. 391, 1912.

Cervus lobatus. *Agassiz*, *Proc. Boston Soc.* vol. ii, p. 188, 1846.

Alces muswa, *Richardson*, *Zool. Herald*, *Mamm.* p. 66, 1852.

Alces lobata, *Fitzinger*, *Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 348, 1873, vol. lxix, pt. 1, p. 528, 1874.

Alce americanus, *Merriam*, *Mammals of Adirondacks*, p. 138, 1884, *N. Amer. Fauna*, no. 5, p. 79, 1891; *Miller*, *Proc. Boston Soc.* vol. xxviii, p. 40, 1897.

Alces machlis americanus, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 46, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 97, 1910, ed. 7, p. 97, 1914.

Paralces americanus, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 160, 1902.

Moose.

Typical locality eastern North America.

Stated to be larger and darker than the typical European

elk, with somewhat more complex antlers, which are apparently always of the palmated type.

FIG. 36.—SIDE VIEW OF HEAD OF AMERICAN ELK, OR MOOSE (*Alces alces americanus*).

From a specimen in the possession of Mr. J. K. Paisley, of Ottawa.

703, *a*. Skin, female, mounted. North America.
*Presented by the Earl of Derby, about* 1845.

52. 6. 25. 1 and 3. Antlers. St. John's, Newfoundland.
*Purchased* (*Argent*), 1852.

79. 1. 27. 1. Skin, mounted. Labrador.
*Purchased* (*Gerrard*), 1879.

89. 3. 4. 1. Skeleton, with antlers, mounted. North America. *Purchased* (*Gerrard, who acquired it from H. Ward of Rochester, U.S.A.*), 1889.

Fig. 37. Muzzle of American Elk (*Alces alces americanus*), showing triangular muffle.

6. 10. 23. 1. Head, mounted. Canada.
*Presented by Frank Hutt, Esq.*, 1906.

9. 11. 10. 1. Skull and antlers. North America.
*Presented by Rev. E. J. May*, 1909.

## D.—Alces alces columbæ.

Alces columbæ, *Lydekker. Field*, vol. cix, p. 182, 1907, *Zool. Record*, vol. xliv, *Mamm.* p. 69, 1907; *Miller. List. N. Amer. Mamm.* p. 391, 1912.

Typical locality Ontario (not, as stated in original description, British Columbia).

Type in the collection of Capt. E. C. Hamilton.

A provisional race, characterised by the muffle being T-shaped (fig. 38), in place of triangular (fig. 37).

No specimen in collection.

Fig. 38.—Muzzle of Ontario Elk (*Alces alces columbæ*), showing T-shaped muffle.

From the type specimen, in the collection of Capt. E. C. Hamilton.

## E.—Alces alces gigas.

Alces gigas, *Miller*, *Proc. Biol. Soc. Washington*, vol. xiii, p. 57, 1899, *List N. Amer. Mamm.* p. 391, 1912.

Alces machlis gigas, *Lydekker*, *Great and Small Game of Europe, etc.* p. 49, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 97, 1910, ed. 7, p. 97, 1914.

Paralces gigas, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xvi. p. 160, 1902.

Typical locality Kenai Peninsula, Alaska.

Type in U.S. National Museum, Washington.

Larger and more richly coloured than *A. a. americanus*, with the occipital region of the skull narrower, the palate wider, and the lower jaw stouter. General colour grizzled black and wood-brown, darker on spine, clear black on chest, flanks, and buttocks, and hair-brown on middle line of under surface; head more finely grizzled than back; ears broccoli-brown externally, yellowish white internally; limbs hair-brown or broccoli-brown, with darker shading.

3. 12. 28. 1. Head, mounted. Kenai Peninsula, Alaska.
*Presented by D. Davies, Esq.*, 1903.

7. 1. 16. 1. Skin, mounted. Alaska.
*Presented by the Hon. Walter Rothschild*, 1907.

Fig. 39.—Front View of Head of Alaskan Elk, or Moose (*Alces alces gigas*).

## XIV. Genus RANGIFER.

Rangifer, *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 8, vol. v, p. 304, 1827; *Brooke, Proc. Zool. Soc.* 1878, p. 927; *Rütimeyer, Abh. schweiz. pal. Ges.* vol. vii, p. 51, 1881; *Lydekker, Deer of All Lands*, p. 33, 1898; *Grant, 7th Rep. N. York Zool. Soc.* p. 1, 1902; *Pocock, Proc. Zool. Soc.* 1910, p. 961; *Miller, Cat. Mamm. West. Europe*, p. 979, 1912.

Tarandus, *Billberg, Synop. Faunæ Scandinav.* vol. i, p. 22, 1827; *Ogilby, Proc. Zool. Soc.* 1836, p. 134.

Procerus, *M. de Serres, Cavernes à Ossements*, ed. 3, p. 143, 1838.

Procervus, *Blainville, C. R. Ac. Sci. Paris*, vol. xi, p. 392, 1840.

Achlis, *Reichenbach, Säugethiere*, vol. iii, p. 12, 1845.

The range includes the northern forests and tundra of both eastern and western hemispheres, extending in the former as far north as Spitsbergen and perhaps Novaya Zemlya, and southwards to central Russia. In America as

far south as northern Columbia, north side of Lake Superior, and New Brunswick.

Lateral metacarpals and vomer as in *Odocoilcus;* a pocket-like gland on front of hind-pasterns only; antlers large, complex, and situated high up on skull, usually present in both sexes, generally with some of the tines palmated, often unsymmetrically, and an "elbow" near the middle of the beam, behind which is a back-tine, those of females simpler and generally smaller; coat unspotted at all ages; ears and tail short; throat fringed; main hoofs short and rounded, lateral hoofs large; large face-glands and tarsal glands, but no metatarsal glands. In the skull (in addition to the high vomer) the gland-pits shallow and ill-defined, the lachrymal vacuities relatively large, the nasals well developed and expanded superiorly; upper canines present in both sexes; lower incisors (fig. 40) small and forming a nearly even and equal-sized series; cheek-teeth small and low-crowned, with the hind (third) lobe of the last lower molars aborted. Size medium or large.

## RANGIFER TARANDUS.

Cervus tarandus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 67, 1758, ed. 12, vol. i, p. 93, 1766; *F. Cuvier, Hist. Nat. Mamm.* vol. ii, pls. 223, 224, 1821; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 83, 1827; *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 169, 1829; *Caton, Antelope and Deer of America*, p. 86, 1877; *Nehring, Tundren and Steppen*, p. 108, 1890.

Cervus tarandus, *a* rangifer, *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 177, 1789.

Cervus guettardi, *Desmarest, Mammalogie*, vol. ii, p. 447, 1822.

Tarandus lapponum, *Billberg, Synop. Faunæ Scandinav.* vol. i, p. 20, 1827.

Cervus (Rangifer) tarandus, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 304, 1827.

Cervus tarandus schottingi, *Sternberg, Isis*, 1828, p. 482.

Tarandus rangifer, *Ogilby, Proc. Zool. Soc.* 1836, p. 134; *Gray, ibid.* 1850, p. 225, *Cat. Ungulata Brit. Mus.* p. 189, 1852, *Cat. Ruminants Brit. Mus.* p. 66, 1872, *Hand-List Ruminants Brit. Mus.* p. 137, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 255, 1862; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxix. pt. 1, p. 534, 1874.

Tarandus borealis, *Rüppell, Verzeichniss Mus. Senckenberg.* vol. iii, p. 183, 1842.

Rangifer tarandus, *Jardine, Naturalist's Libr., Mamm.* vol. iii, p. 133, pl. vi, 1835; *Gray, List Mamm. Brit. Mus.* p. 181, 1843; *Brooke,*

*Proc. Zool. Soc.* 1878, p. 928; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 312, 1884; *Flower and Lydekker, Study of Mammals*, p. 325, 1891; *Lydekker, Horns and Hoofs*, p. 326, 1893, *British Mammals*, p. 253, 1935, *Deer of All Lands*, p. 33, pl. i, 1898, *Great and Small Game of Europe, etc.* p. 24, 1901; *Scharff, Proc. R. Irish Ac.* ser. 3, vol. iv, 473, 1897, *European Animals*, p. 110, 1907; *Grant, 7th Rep. New York Zool. Soc.* p. 4, 1902; *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xix, p. 125, 1903; *Winge, Danmarks Fauna, Pattedyr*, p. 179, 1908; *Pocock, Proc. Zool. Soc.* 1910, p. 960; *Trouessart, Faune Mamm. Europe*, p. 231, 1910; *Ward, Records of Big Game*, ed. 6, p. 83, 1910, ed. 7, p. 83, 1914; *Miller, Cat. Mamm. West. Europe*, p. 980, 1912.

Tarandus furcifer, *Baird, Rep. Comm. Patents*, 1851, vol. ii, *Agric.* p. 109, 1852.

Reindeer; Caribou.

Typical locality mountains of Swedish Lapland.

A variable and widely-spread species, of which most of the characters are the same as those of the genus. Coat

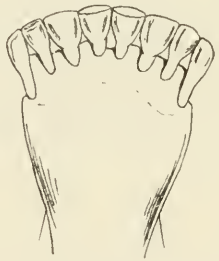


Fig. 40.—Lower Front Teeth of Reindeer (*Rangifer tarandus*).
From Miller, *Cat. Mamm. Western Europe.*

dense and compact; general colour varying from clove-brown, with more or less white or whitish grey on under-parts, inner surfaces of limbs, above the hoofs, and on the muzzle, and in some cases whitish rings round the eyes, to nearly white on the one hand and to blackish brown on the other; typically a white area in the region of the tail, which includes the sides but not the upper surface of the latter, and the tarsal tuft generally white. The antlers are smooth, and brownish white in colour, but the hoofs are jet black. A height of 4 feet 10 inches at the shoulder has been recorded in the Newfoundland race.

The range is co-extensive with that of the genus.

It is not at present possible to give a trustworthy "key" to the various races. The European and West Asiatic (exclusive of Novaya Zemlyan) races are distinguishable as follows:—

A. Size smaller, upper length of skull less than $8\frac{7}{8}$ inches (225 mm.)..... *R. t. platyrhynchus.*

B. Size larger, upper length of skull ranging from about $10\frac{5}{8}$ (270 mm.) to $11\frac{7}{8}$ inches (300 mm.).

*a*. Upper length of skull from about $10\frac{5}{8}$ to $11\frac{3}{8}$ inches..... *R. t. tarandus.*

*b*. Upper length of skull about $11\frac{7}{8}$ inches..... *R. t. fennicus.*

East Asiatic (including Novaya Zemlyan) and American races fall into two groups, in the first of which (A) the antlers are short with no tineless interval on the beam, and most of the tines much palmated, while in the second (B) the antlers are of great length, with a long tineless interval on the beam, and the tines themselves not greatly palmated Intermediate forms tend to connect the extreme types.

A. Woodland Group.

| | |
|---|---|
| *R. t. sibiricus.* | *R. t. terrænovæ.* |
| *R. t. pearsoni.* | *R. t. montanus.* |
| *R. t. phyllarchus.* | *R. t. dawsoni.* |
| *R. t. caribou.* | *R. t. stonei.** |
| *R. t. sylvestris.* | (?) *R. t. fortidens.** |

B.—Barren-Ground Group.

| | |
|---|---|
| *R. t. osborni.* | *R. t. arcticus.* |
| *R. t. granti.* | *R. t. grœnlandicus.* |
| *R. t. excelsifrons.* | *R. t. pearri.* |

## A.—Rangifer tarandus tarandus.

Rangifer tarandus typicus, *Lydekker, Deer of All Lands*, p. 33, 1898; *Ward, Records of Big Game*, ed. 6, p. 84, 1910, ed. 7, p. 84, 1914.

Rangifer tarandus *var.* cylindricornis, *Camerano, Mem. R. Acc. Sci. Torino*, ser. 2, vol. li, p. 167, 1902.

Reindeer.

Typical locality the mountains of Swedish Lapland.

Size relatively small, with subcylindrical antlers of an

* Intermediate types.

elongated type, with both basal-tines frequently palmated and nearly symmetrical, and a small back-tine; those of females small; general colour greyish or drab brown, passing into buffish white on muzzle and under-parts; a longitudinal darker area on sides of body; tail buffish white with a dark median line.

The distribution formerly included the whole of the mountainous tract of the Scandinavian Peninsula, but is now restricted in the wild state to two widely separated districts in Norway, namely, west Finmark in the north, and the main high mountain region in the south. The race is domesticated throughout Scandinavian Lapland and parts of Russia.

44. 9. 26. 1. Skin, young, mounted. From an animal bred in England; provisionally referred to this race. *Presented by Sir J. M. Wilson*, 1844.

46. 6. 10. 1 (702, *a*). Skeleton, with antlers. Locality unknown; reference provisional. *Same donor*, 1846.

68. 12. 29. 11 (702, $c^2$). Skeleton, with antlers, mounted. Northern Europe. *Purchased* (*Zoological Society*), 1868.

75. 10. 30. 1 (702, $d^1$). Skull and skin, female. Fillefjeld, Norway. *Presented by J. C. Ingram, Esq.*, 1875.

79. 10. 9. 1 (702, $g^1$). Skin, mounted, and skeleton. Same locality. *Same donor*, 1879.

81. 9. 28. 1 (702, $i^2$). Skeleton and antlers. Same locality. *Presented by Sir W. J. Ingram, Bart.*, 1881.

81. 9. 28. 2 (702, $j^1$). Skin, mounted, and skeleton. Same locality. *Same history.*

83. 7. 28. 1 (702, $k^1$). Skull, with antlers, and skin, female. Norway. *Presented by J. C. Ingram, Esq.*, 1883.

83*. 7. 28. 2 (702, $l^2$). Skull and skin, young female. Norway. *Same history.*

87. 9. 20. 1. Skin, mounted. Loerdal Mountains, Sogne Fjord, Norway. *Presented by Sir W. J. Ingram, Bart.*, 1887.

87. 9. 20. 2. Antlers, female. Same locality. *Same history.*

87. 9. 20. 3. Antlers. Same locality. *Same history.*

## B.—Rangifer tarandus fennicus.

Rangifer tarandus fennicus, *Lönnberg*, *Arkiv Zool.* vol. vi, no. 4, p. 10, 1909; *Ward*, *Records of Big Game*, ed. 6, p. 84, 1910, ed. 7, p. 84, 1914.

Rangifer fennicus, *Miller*, *Cat. Mamm. West. Europe*, p. 981, 1912.

Typical locality Tornea, Lappmark, Finland.

The range is probably now restricted to the wooded portions of Finland, eastward to the Kola Peninsula, but seems to have formerly extended westwards into the wooded portion of northern Sweden where this race may be represented by the large woodland breed of tame reindeer found in certain districts.

Type in the Royal Swedish Museum of Natural History.

Size larger than in *R. t. tarandus;* skull with the nasal bones narrow and highly arched, and the teeth relatively small, the length of the upper series of cheek-teeth being about $3\frac{3}{8}$ inches (85 mm.), and that of the lower series about $3\frac{9}{16}$ inches (90 mm.).

No specimen in collection.

## C.—Rangifer tarandus platyrhynchus.

Cervus (Tarandus) platyrhynchus, *Vrolik*, *Nieuwe Verhandl. Kron. Nederl. Inst., Eerste Klasse*, pt. 2, p. 160, 1829.

Cervus tarandus, *forma* spetsbergensis, *Andersen*, *Öfvers. Vet.-Ak. Förhandl.* vol. xix, p. 457, 1862; *Nitsche*, *Jahresb. Ver. nat. Württ.* 1893, p. 111.

[Rangifer arcticus], *var.* spitzbergensis, *Murray*, *Geogr. Distrib. Mamm.* p. 154, 1866.

Rangifer tarandus spetzbergensis, *Lydekker*, *Deer of All Lands*, p. 41, 1898.

Rangifer spitzbergensis, *Camerano*, *Mem. Acc. Sci. Torino*, ser. 2, vol. li, p. 159, 1902; *Grant*, *7th Rep. New York Zool. Soc.* p. 1902; *Trouessart*, *Faune Mamm. Europe*, p. 232, 1910.

Rangifer platyrhynchus, *Miller*, *Cat. Mamm. West. Europe*, p. 985, 1912.

Typical locality Spitsbergen, to which island this race is confined.

Size considerably less than in the typical race; nasal bones of skull with the profile little arched, and the two extremities expanded and the middle portion constricted; cheek-teeth relatively as large as in the typical race.

90. 12. 4. 3. Antlers, female. Spitsbergen.
*Presented by Dr. R. McCormick*, 1890.

90. 12. 4. 8. Antlers. Spitsbergen. *Same history.*

96. 9. 23. 1. Skull and antlers. Spitsbergen. Noticed in *Deer of All Lands*, p. 41.
*Presented by Dr. J. W. Gregory*, 1896.

## D.—Rangifer tarandus sibiricus.

Cervus sibiricus, *Schreber, Säugthiere*, pl. 248, C, 1784.

[Rangifer arcticus], *var.* sibiricus, *Murray, Geogr. Distrib. Mamm.* p. 153, 1866.

Rangifer tarandus sibiricus, *Lydekker, Proc. Zool. Soc.* 1902, vol. ii, p. 361; *Lönnberg, Arkiv Zool.* vol. vi, no. 4, p. 17, 1909; *Ward, Records of Big Game*, ed. 6, p. 84, 1910, ed. 7, p. 84, 1914; *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35.

Typical locality Siberia.

Antlers approximating to those of *R. t. caribou* (*infra*), but with less palmation of the basal tines; much smaller than *R. t. phyllarchus*.

702, *h*. Frontlet and antlers. Probably Siberian.
*No history.*

52. 12. 9. 4. Skull and antlers. Probably Siberian.
*Purchased* (*Brandt*), 1852.

78. 12. 21. 30. Antlers, in velvet. Salair, Altai; collected by Dr. O. Finsch. *By exchange with the Geographical Society of Bremen*, 1878.

## E.—Rangifer tarandus pearsoni.

Rangifer tarandus pearsoni, *Lydekker, Proc. Zool. Soc.* 1902, vol. ii, p. 361; *Ward, Records of Big Game*, ed. 6, p. 84, 1910, ed. 7, p. 84, 1914.

Typical (and only) locality Novaya Zemlya.

Type in possession of H. J. Pearson, Esq., Bramcote, Nottinghamshire.

Distinguished from other Old World races by the symmetry of the antlers (fig. 40), and the excessive palmation of the basal and second tines and summits; the whole antler approximating to the *R. t. caribou* type.

No specimen in collection.

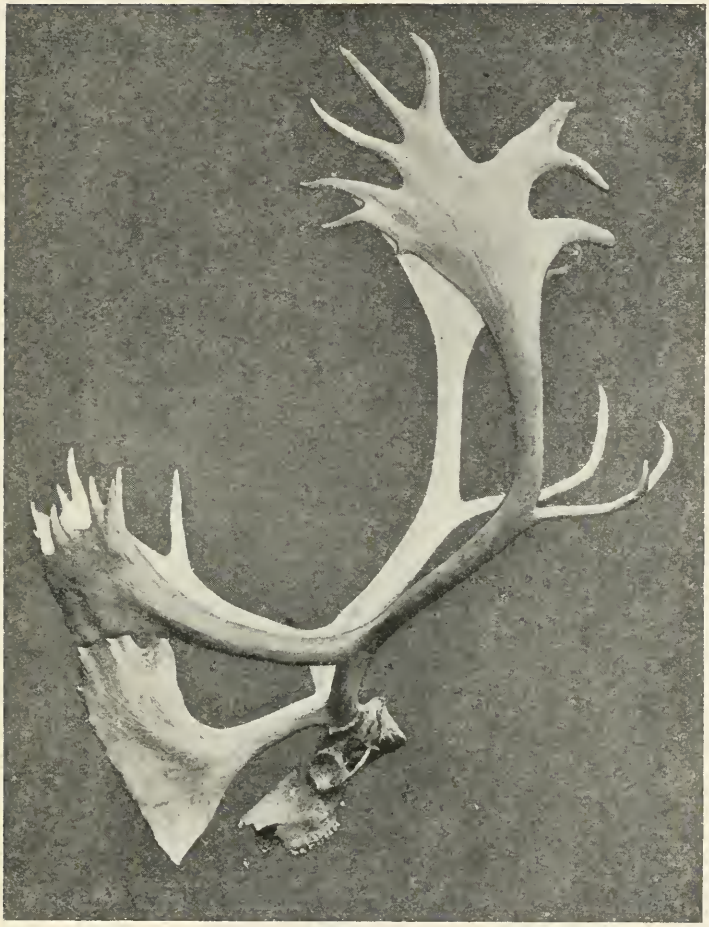


FIG. 41.—SIDE VIEW OF SKULL AND ANTLERS OF NOVAYA ZEMLYAN REINDEER (*Rangifer tarandus pearsoni*).

## F.—Rangifer tarandus phylarchus.

Rangifer phylarchus, *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35, p. 6, 1912.

Typical locality Kamchatka.

Type in U.S. National Museum.

Described from a skull (without antlers), measuring 15¼ inches (387 mm.), against 14½ inches (357 mm.) in a

skull of *R. t. fennicus*, and thus indicating a race larger than of the other Old World forms, and probably related to the American *R. t. caribou*.

No specimen in collection.

## G.—Rangifer tarandus caribou.

Cervus tarandus caribou, *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 177, 1788.

Cervus hastalis, *Agassig, Silliman's Journ.* 1847, p. 436.

Rangifer caribou, *Audubon and Bachman, Quadrupeds N. Amer.* vol. iii, p. 111, 1853; *Baird, N. Amer. Mamm.* p. 633, 1857; *J. A. Allen, Bull. Amer. Mus. Nat. Hist.* vol. viii, p. 234, 1896; *Miller, Proc. Boston Soc.* vol. xxviii, p. 40, 1897; *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 35, 1901, *Cat. Mamm. Field Mus.* (*op. cit.* vol. viii, p. 40, 1907); *Grant, 7th Rep. New York Zool. Soc.* p. 5, 1902; *Stone and Cram, American Animals*, p. 47, 1903.

Tarandus hastalis, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. lxviii, pt. 1, p. 349, 1873, vol. lxix, pt. 1, p. 542, 1874.

Rangifer tarandus caribou, *True, Proc. U.S. Nat. Mus.* vol. vii, p. 592, 1885; *Lydekker, Deer of All Lands*, p. 42, 1898, *Great and Small Game of Europe, etc.* p. 29, 1901; *Pocock, Proc. Zool. Soc.* 1910, p. 960; *Ward, Records of Big Game*, ed. 6, p. 84, 1910, ed. 7, p. 84, 1914.

Rangifer caribou caribou, *Miller, List N. Amer. Mamm.* p. 392, 1912.

Caribou, or Woodland Caribou.

Typical locality Eastern Canada.

A large-sized race, with the antlers stout, flattened, much palmated, and not of excessive length, one of the brow-tines being much expanded, while the other is simple; the bez-tine is also more palmated than in the Scandinavian reindeer, and the back-tine well developed. Female antlers are proportionately smaller than in the typical race. General colour much darker than in the Newfoundland race (p. 248), the dark area extending over the anterior half of the lower surface of the body; and, except the extremity of the upper lip, the muzzle as dark as the face, no light ring round the eye; on the limbs the white restricted to a sharply-defined band of about half-an-inch in width above the hoofs, but ascending behind to enclose the lateral hoofs; lower incisors diminishing gradually in size from middle to outer pair.

702, *b*. Head, mounted, with the antlers in velvet (fig. 42). Arctic America.

*Presented by the Hudson Bay Co., about* 1850.

Fig. 42.—Front View of Head of Woodland Caribou (*Rangifer tarandus caribou*), with the antlers in "velvet."

702, *c*[1]. Skull and antlers. North America; collected by Sir John Franklin. *Purchased* (?).

702, *f*. Antlers, female. North America: same collector. *Same history.*

702, *d*. Skull and antlers. North America. *No history.*

46. 3. 13. 1. Skull and antlers. North America. *Purchased (Argent)*, 1846.

46. 8. 19. 7. Front of skull and antlers. Green Pond, Nova Scotia; collected by Mr. J. Florence; figured in *Deer of All Lands*, p. 43. *Purchased*, 1846.

65. 10. 24. 6 (702, *y*). Skull and antlers, female. North America. *Presented by A. Murray, Esq.*, 1865.

65. 10. 24. 8 (702, $a^2$). Skull and antlers. North America. *Same history.*

3. 2. 15. 2. Skin, mounted. Canada. *Presented by the Dominion Government*, 1903.

## H.—Rangifer tarandus sylvestris.

Cervus tarandus, *var.* sylvestris, *Richardson, Fauna Bor.-Amer.* p. 251, 1829.

Rangifer caribou sylvestris, *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35, p. 4. 1912; *Miller, List N. Amer. Mamm.* p. 392, 1912.

Typical locality south-west shore of Hudson Bay.

Closely allied to last, but regarded by Hollister as entitled to distinction, the skull being longer and more slender, with a narrower rostrum, longer nasals, and larger cheek-teeth; neck, especially the sides, and head darker, and the ears much darker, with the hairs, like those of the sides of the neck, brown to the roots.

No specimen in collection.

## I.—Rangifer tarandus terrænovæ.

Rangifer terrænovæ, *Bangs, Descript. Newfoundland Caribou*, 1896; *Allen, Bull. Amer. Mus. Nat. Hist.* vol. viii, p. 233, 1896; *Elliot, Synop. Mamm. N. Amer.* (*Zool. Pub. Field Mus.* vol. ii) p. 36, 1901, *Cat. Mamm. Field Mus.* (*op. cit.* vol. viii) p. 40, 1907; *Grant, 7th Rep. New York Zool. Soc.* p. 5, 1902; *Stone and Cram, American Animals*, p. 51, 1903; *Miller, List N. Amer. Mamm.* p. 393, 1912; *Dugmore, The Newfoundland Caribou*, p. 120, 1913.

Rangifer tarandus terrænovæ, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. viii, p. 235, 1896; *Lydekker, Deer of All Lands*, p. 45, 1898, *Great and Small Game of Europe, etc.* p. 31, 1901; *Ward, Records of Big Game*, ed. 6, p. 85, 1910, vol. xiv, p. 85. 1914.

Typical (and only) locality Newfoundland.

Nearly allied to *R. t. caribou*, the bodily size being large, and the antlers massive and much palmated, with numerous points on all the branches and especially on the hind border of the beam. General colour in autumn greyish brown, becoming lighter on the flanks, and passing into nearly pure white on the under surface; neck dirty white, somewhat purer in front; a broad, ill-defined light ring round each eye, and muzzle and lower portion of the face, as well as extremity of lower jaw, greyish white; rest of head like back; edges and lower surface of tail and buttocks white; front and outer surfaces of limbs brownish grey; feet and terminal third of shanks white, passing gradually into the general colour of the limbs above. Females show rather less white; and the young are still darker, with a dusky line on the flanks, and a blackish streak running down the back and expanding over the shoulders.

99. 2. 1. 1. Head, mounted. West Newfoundland.
*Presented by Lieut. W. G. P. Graves, R.N.*, 1899.

7. 3. 11. 2. Skin, mounted. Newfoundland.
*Presented by F. C. Selous, Esq.*, 1907.

8. 1. 19. 1. Skull and antlers. Newfoundland.
*Presented by St. George Littledale, Esq.*, 1908.

## J.—Rangifer tarandus montanus.

Rangifer montanus, *Seton-Thompson*, *Ottawa Naturalist*, vol. xiii, p. 129, 1899; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 36, 1901, *Cat. Mamm. Field Mus.* (*op. cit.* vol. viii) p. 40, 1907; *Grant*, *7th Rep. New York Zool. Soc.* p. 5, 1902; *Stone and Cram*, *American Animals*, p. 51, 1903; *Miller*, *List N. Amer. Mamm.* p. 393, 1912.

Rangifer tarandus montanus, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 33, 1901, *Proc. Zool. Soc.* 1902, vol. ii, p. 361; *Ward*, *Records of Big Game*, ed. 6, p. 85, 1910, ed. 7, p. 85, 1914.

Typical locality Selkirk Range, British Columbia.

Antlers (fig. 43) of the general type of those of the woodland race, but in their relative shortness and much branched character recalling those of *R. t. terrænovæ*, although lighter and more slender; the most distinctive feature of this race is the dark colour of the autumn coat, which is

blackish brown all over the body and limbs, passing in some individuals into glossy black on the middle of the back from the withers to the rump, the shoulders, flanks, and under-

FIG. 43.—SIDE VIEW OF SKULL AND ANTLERS OF MOUNTAIN CARIBOU (*Rangifer tarandus montanus*), to show "Woodland" type of antlers.
From *7th Rep. N. York Zool. Soc.*

parts being lighter and the neck grey. Females are much darker than males, especially on the neck and shoulders, but have the light ring above the hoofs, the nose and the edges of the lips pure white instead of grey. This race may

be diagnosed as a black caribou of the woodland type, with the neck and shoulders, especially in males, much lighter than the body and limbs. In general form it comes very close to *R. t. stonei*, in which, however, the antlers approach the Barren-Ground type, while the colour is different.

No specimen in collection.

## K.—Rangifer tarandus dawsoni.

Rangifer dawsoni, *Seton-Thompson, Ottawa Naturalist*, vol. xiii, p. 260, 1900; *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 86, 1901; *Miller, List N. Amer. Mamm.* p. 392, 1912.

Typical locality Graham Island, Queen Charlotte Group.

Size smaller; colour relatively dark, but lighter than in *R. t. montanus*, the general tint being mouse-colour.

No specimen in collection.

## L.—Rangifer tarandus stonei.

Rangifer stonei, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xiv, p. 143, 1901; *Grant, 7th Rep. New York Zool. Soc.* p. 5, 1902; *Stone and Cram, American Animals*, p. 51, 1903; *Miller, List N. Amer. Mamm.* p. 393, 1912.

Rangifer tarandus stonei, *Lydekker, Great and Small Game of Europe, etc.* p. 36, 1901, *Proc. Zool. Soc.* 1902, vol. ii, p. 361; *Ward, Records of Big Game*, ed. 6, p. 85, 1910, ed. 7, p. 85, 1914.

Typical locality Kenai Peninsula, Alaska.

Type in American Museum of Natural History, New York.

As dark as *R. t. montanus*, but with a heavy white throat-fringe; size large; antlers somewhat larger than those of other members of the Woodland Group, and thus approaching those of the Barren-Ground Group.

4. 5. 27. 1. Head, mounted. Alaska. Reference to this race provisional. *Purchased*, 1904.

## M.—Rangifer tarandus fortidens.

Rangifer fortidens, *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35, p. 3, 1912; *Miller, List N. Amer. Mamm.* p. 392, 1912.

Typical locality Alberta, Canada.

Type in U.S. National Museum.

The largest of the caribou, exceeding in point of size the biggest examples of *R. t. montanus* and *R. t. osborni;* general colour, inclusive of under-parts, very dark; lower incisors of the type of those of *R. t. caribou;* cheek-teeth larger than in any other American race; antlers stout and broadly palmated, shorter and thicker than in *R. t. osborni,* with the beam nearly straight; females usually without antlers.

No specimen in collection.

## N.—Rangifer tarandus osborni.

Rangifer osborni, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 149, 1992; *Grant, 7th Rep. New York Zool. Soc.* p. 5, 1902; *Miller, List N. Amer. Mamm.* p. 393, 1912.

Rangifer tarandus osborni, *Ward, Records of Big Game,* ed. 6, p. 85, 1910, ed. 7, p. 85, 1914.

Typical locality Cassiar Mountains, British Columbia.

Type in American Museum of Natural History, New York.

This and the next race are dark-coloured mountain caribou, with antlers of the Barren-Ground type, but the bodily size much greater than in *R. t. arcticus.*

The present race is characterised by the brown colour of the autumn coat and the large amount of white on the rump and the hind half of the under surface of the body; the whole neck and shoulders, as well as the back and limbs, being much lighter than in the Selkirk race. As the antlers correspond in form and proportion with those of the Barren-Ground caribou, they serve to connect the Selkirk race with the latter.

5. 1. 16. 2. Skull and antlers. Ogilvie Mountains, Alaska. *Presented by F. C. Selous, Esq.,* 1905.

6. 10. 10. 1. Head, mounted, with abnormal palmation of tips of antlers. Dease Lake, British Columbia.
*Presented by G. M. Norris, Esq.,* 1906.

7. 3. 11. 1. Skin, mounted. Yukon.
*Presented by F. C. Selous, Esq.,* 1907.

## O.—Rangifer tarandus granti.

Rangifer granti, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 192, 1902; *Grant, 7th Rep. N. York Zool. Soc.* p. 5. 1902; *Stone and Cram, American Animals*, p. 54, 1903; *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35, p. 7, 1912; *Miller, List N. Amer. Mamm.* p. 392, 1912.

Rangifer tarandus granti, *Ward, Records of Big Game*, ed. 6. p. 85, 1910, ed. 7, p. 85, 1914.

Western end of Alaskan Peninsula, opposite Popoff Island.

Type in American Museum of Natural History, New York.

Nearly related to the preceding race, but distinguished by details of colouring, and apparently by the markedly hypsodont cheek-teeth. From *R. t. stonei* it differs not only by its longer antlers and inferior bodily size, but also in coloration and the characters of the skull. General colour dark brown, varying somewhat according to season, with a large white rump-patch and white tail, through the middle line of the upper surface of which runs a dark streak; this white rump-patch serving at once to distinguish *R. t. granti* from *R. t. stonei*, in which the whole of the hind-quarters are dark-coloured. This caribou apparently inhabits an isolated area formed by the treeless districts of the Alaskan Peninsula and some of the adjacent islands, from at least one of which it has been exterminated.

No specimen in collection.

## P.—Rangifer tarandus excelsifrons.

Rangifer excelsifrons, *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35, p. 5, 1912; *Miller, List N. Amer. Mamm.* p. 392, 1912.

Typical locality Meade Valley, near Point Barrow, Alaska.

Type in U.S. National Museum, Washington.

Described from the skull, which is characterised by its shortness and breadth, with the brain-case much elevated, and the hollow between the orbits deep and rounded; teeth of the general type of those of *R. t. arcticus*. A some-

what similar elevation of the frontal region is exhibited in the skull of *R. t. grœnlandicus*, which is, however, of a narrow type.

No specimen in collection.

## Q.—Rangifer tarandus arcticus.

Cervus tarandus arcticus, *Richardson*, *Fauna Bor.-Amer.* p. 23, 1829.

Tarandus arcticus, *Baird*, *Rep. Comm. Patents*, 1851, vol. ii, *Agric.* p. 105, 1852.

Rangifer arcticus, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. viii, p. 234, 1896; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 37, 1901, *Cat. Mamm. Field Mus.* (*op. cit.* vol. viii) p. 41, 1907; *Grant*, *7th Rep. New York Zool. Soc.* p. 5, 1902; *Stone and Cram*, *American Animals*, p. 53, 1903; *Hollister*, *Smithson. Misc. Collect.* vol. lvi, no. 35, pl. i, 1912; *Miller*, *List N. Amer. Mamm.* p. 391, 1912.

Rangifer tarandus arcticus, *Lydekker*, *Deer of All Lands*, p. 47, 1898, *Great and Small Game of Europe*, *etc.* p. 38, 1901; *Ward*, *Records of Big Game*, ed. 6, p. 84, 1910, ed. 7, p. 84, 1914.

Barren-Ground Caribou.

Typical locality Fort Enterprise, Mackenzie district, Canada.

Size relatively small. Antlers (fig. 44) very long, slender, and rounded, with few points on the expanded portion of the beam, which is separated by a long interval from the third tine; the latter, which is but slightly palmated, generally with one of the basal tines more or less expanded; back-tine usually, if not always, wanting; female-antlers much smaller, simpler, and scarcely curved at all. General colour in summer clove-brown, mingled with reddish and yellowish brown, under-parts white; in winter entire coat dirty white; lower incisors diminishing suddenly in size from the middle to the outer pair, which are very small.

51. 10. 24. 1. Skull and antlers. Arctic America.
*Purchased* (*Argent*), 1851.

55. 5. 14. 2 (702, *w*). Skeleton and antlers. Arctic America; collected by Dr. J. Rae. *Purchased*, 1855.

7. 9. 4. 7. Skull and antlers. Baffinland.
*Presented by Crawford Noble, Esq.*, 1907.

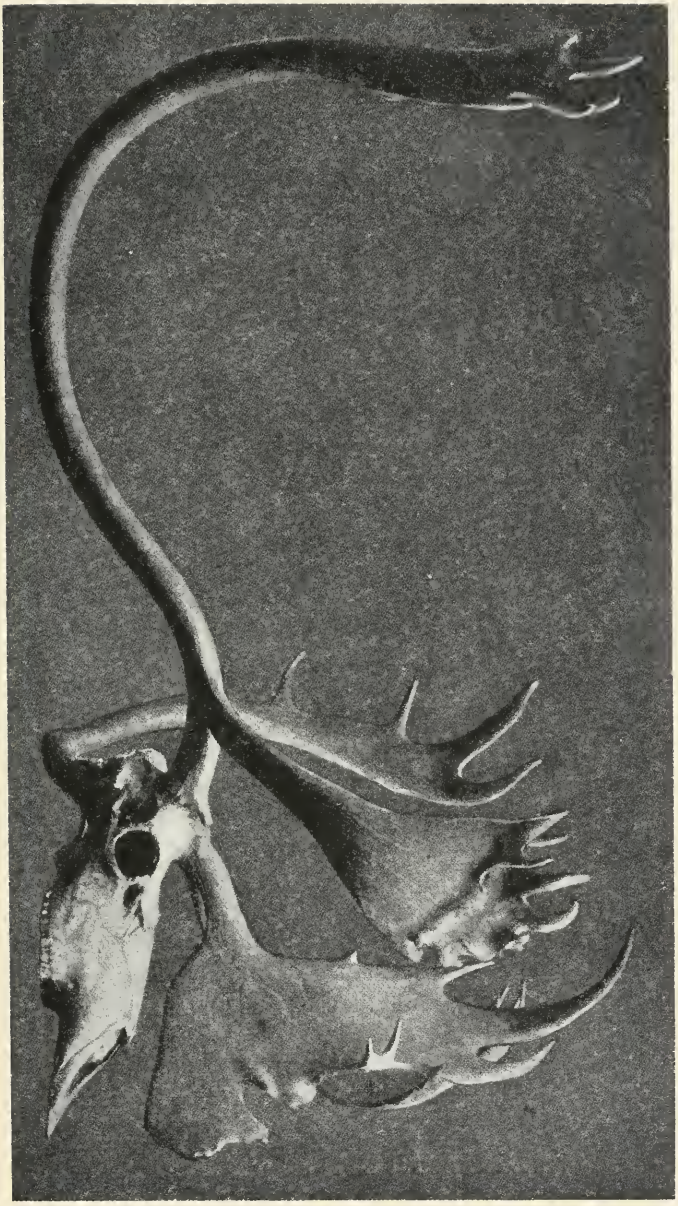


FIG. 44.—SIDE VIEW OF SKULL AND ANTLERS OF BARREN-GROUND CARIBOU (*Rangifer tarandus arcticus*), to show "Barren-Ground" type of antlers.

From *7th Rep. N. York Zool. Soc.*

## R.—Rangifer tarandus grœnlandicus.

Cervus tarandus grœlandicus, *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 177, 1788.

Rangifer grœnlandicus, *Baird, N. Amer. Mamm.* p. 634, 1857; *Caton, Deer and Antelope of N. America*, p. 105, 1877; *Allen, Bull. Amer. Mus. Nat. Hist.* vol. viii, p. 234, 1896; *Elliot, Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.* vol. ii) p. 37, 1901; *Grant, 7th Rep. New York Zool. Soc.* p. 5, 1902; *Stone and Cram, American Animals*, p. 54, 1903; *Hollister, Smithson. Misc. Collect.* vol. lvi, no. 35, p. 5, 1912; *Miller, List N. Amer. Mamm.* p. 393, 1912.

Rangifer tarandus grœnlandicus, *Lydekker, Deer of All Lands*, p. 47, 1898, *Great and Small Game of Europe, etc.* p. 37, 1901; *Ward. Records of Big Game*, ed. 6, p. 85, 1910, ed. 7, p. 85, 1914.

Typical locality Greenland.

Closely allied to *R. t. arcticus*, with a broad sharply defined white ring round each eye, and distinct broad white bands above the hoofs; skull with an elevated frontal region comparable to that of *R. t. excelsifrons*, but markedly narrower.

10. 1. 20. 1. Skull and antlers. Greenland.
*Presented by Sir Robert Harvey, Bart.*, 1910.

## S.—Rangifer tarandus pearyi.

Rangifer pearyi, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 409, 1902; *Grant, 7th Rep. New York Zool. Soc.* p. 5, 1902; *Miller, List N. Amer. Mamm.* p. 393, 1912.

Typical locality Ellesmereland, Lat. 79° N.

Type in American Museum of Natural History, New York.

Wholly white at all seasons, with the exception of a large slaty grey area, larger in females than in males, on the middle and hind part of the back; the long and thick coat softer and finer than in the Greenland race, which is much darker.

No specimen in collection.

The following specimens are not racially determined:—

46. 4. 25. 23. Frontlet and antlers. North America.
*Purchased* (*Argent*), 1846.

65. 10. 34. 5 (702, *x*). Skull and antlers. North America. *Presented by A. Murray, Esq.*, 1865.

## XV. Genus HYDROPOTES.

Hydropotes, *Swinhoe, Proc. Zool. Soc.* 1870, p. 89; *Brooke, ibid.* 1872, p. 522, 1878, p. 916; *Garrod, ibid.* 1877, p. 780; *Rütimeyer, Abh. schweiz. pal. Ges.* vol. viii, p. 21, 1881; *Pocock, Proc. Zool. Soc.* 1910, p. 956; *nec* Hydropota, *Rondani*, 1861.

Hydrelaphus, *Lydekker, Deer of All Lands*, p. 219, 1898; *Trouessart, Cat. Mamm., Suppl.* p. 691, 1905; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 37, 1907.

Lateral metacarpals as in *Odocoilcus*, that is to say, represented by their lower extremities; antlers wanting; muzzle with a large naked area surrounding nostrils; ears moderate, narrow, and pointed; tail very short; face rather long; coat uniformly coloured in adult, spotted in young; no metatarsal or tarsal glands; lachrymal pits of skull small but deep; face-glands small; hind-pasterns with a gland forming a deep interdigital cleft, as in *Dama*, and hoofs united at heels by a fold of skin, no distinct gland in fore-feet; lateral hoofs of moderate size; upper canines forming long, curved, and slightly convergent tusks (fig. 45), which grow from semi-persistent pulps, those of females smaller; cheek-teeth tall-crowned. Size small. In old animals the pulp-cavity of the upper canines obliterates. The auditory bullæ are greatly inflated, and the hind angle of the lower jaw is much produced backwards, forming a compressed semicircular process projecting behind the level of the condyle; the vomer does not divide the aperture of the posterior nostrils.

The distribution is restricted to China and Korea.

### HYDROPOTES INERMIS.

Hydropotes inermis, *Swinhoe, Proc. Zool. Soc.* 1870, p. 89; *Hamilton, ibid.* 1871, p. 258, 1873, p. 473; *Brooke, ibid.* 1872, p. 522, 1878, p. 916; *Gray, Cat. Ruminants Brit. Mus.* p. 95, 1872, *Hand-List Ruminants Brit. Mus.* p. 166, 1873; *Garrod, Proc. Zool. Soc.* 1877, p. 789; *Forbes, ibid.* 1882, p. 636; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 321, 1884; *Flower and Lydekker, Study of Mammals*, p. 328, 1891; *Lydekker, Horns and Hoofs*, p. 322, 1893; *Hilzheimer, Abh. Mus. Naturkunde Magdeburg*, vol. i, p. 171, 1906; *Pocock, Proc. Zool. Soc.* 1910, p. 956.

Hydropotes affinis, *Brooke, Proc. Zool. Soc.* 1872, p. 524; *Hilzheimer, Abh. Mus. Naturkunde Magdeburg*, vol. i, p. 171, 1906.

(?) Hydropotes argyropus, *Heude, C. R. Ac. Sci. Paris*, vol. xcviii, p. 1017, 1884; *Hilzheimer, Abh. Mus. Naturkunde Magdeburg*, vol. i, p. 171, 1906.

Hydrelaphus inermis, *Lydekker, Deer of All Lands*, p. 221, pl. xvii, fig. 2, 1898, *Great and Small Game of Europe, etc.* p. 266, 1901; *Trouessart, Cat. Mamm., Suppl.* p. 691, 1905; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 89, 1907; *Allen, Bull. Mus. Harvard Coll.* vol. xl, p. 204, 1912.

Hydropotes kreyenbergi, *Hilzheimer, Zool. Anz.* vol. xxix, p. 298, 1905, *Abh. Mus. Naturkunde Magdeburg*, vol. i, p. 171, pl. ii, 1906; *Allen, Bull. Mus. Harvard Coll.* vol. xl, p. 205, 1912.

Chinese Water-Deer.

Typical locality Chin-kiang, China.

Height at shoulder about 20 inches; hairs coarse and thick, longest on neck and rump, on back and sides flattened and undulated from side to side; general colour light rufous chestnut, stippled with blackish, the rufous most marked on head and backs of ears; the individual hairs greyish white from the base for the greater part of their length, then blackish brown, and finally light chestnut, the dark rings giving the stippled appearance to the coat; neck paler than back; shoulders, limbs, and tail brownish chestnut; underparts, front of thighs, chin, throat, a narrow band on muzzle, a mark above each eye, and inner surfaces of ears white or whitish; young sparsely and indistinctly marked with white spots running in longitudinal lines, especially on hindquarters, and the hair of back softer than in adults, and uniformly chestnut, without annulations.

The range extends from the Yang-tsi-kiang Valley to Korea (*H. argyropus*).

70. 7. 18. 15 (1551, *a*). Skull and skin. Island in Yang-tsi-kiang, near Chin-kiang; purchased in Shanghai market, November, 1868, by R. Swinhoe, Esq. Type. *Purchased*, 1870.

72. 9. 3. 4 (1551, *b*). Skull and skin. Same locality and collector. *Purchased*, 1872.

72. 9. 3. 5 (1551, *c*). Skull and skin. Shanghai (? market); same collector. *Same history.*

72. 9. 3. 6 (1551, *d*). Skull and head-skin, immature. Same locality and collector. *Same history.*

72. 9. 3. 7 (1551, *e*). Skeleton, mounted, and head-skin. Same locality and collector. *Same history.*

76. 4. 4. 1 (1551, *f*). Skeleton and imperfect skin, albino. Locality unknown. *Purchased* (*Bartlett*), 1876.

77. 7. 6. 1. Uterus, with five fœtuses, in spirit. Yang-tsi Valley. *Presented by Dr. G. K. Barton*, 1877.

80. 3. 30. 6–7. Two skulls. Wuku, near Kiu-kiang, Hankau district; collected by C. Maries, Esq. This is the typical locality (misprinted Kinkian in Hilzheimer's 1906 description) of *H. kreyenbergi*, and is much too near Chin-kiang to admit of its water-deer being even racially distinct from the typical form of the species. *Purchased*, 1880.

88. 11. 31. 2–3. Two fœtuses, in spirit, Kiu-kiang; collected by F. W. Styan, Esq. *Purchased*, 1888.

Fig. 45.—Skull of Chinese Water-Deer (*Hydropotes inermis*).

0. 6. 27. 5. Skin, young. Pao-chi, Shen-si. *Presented by Father Hugh*, 1900.

0. 10. 30. 1. Skin, female, mounted. Island in the Yang-tsi-kiang. *Presented by the Duke of Bedford, K.G.*, 1900.

1. 3. 2. 22. Skull and skin. Ka-shing, Yang-tsi Valley. *Presented by F. W. Styan, Esq.*, 1901.

6. 5. 14. 3. Skull and head-skin, female, Chin-kiang. *Presented by J. de La Touche, Esq.*, 1906.

6. 12. 5. 14–15. Two skulls. Chin-kiang. *Same history.*

7. 7. 3. 32. Skull. North China. *Presented by E. B. Howell, Esq.*, 1907.

8. 7. 25. 43. Skin. Kun-tun, north-western Fo-kien. *Presented by J. de La Touche, Esq.*, 1908.

8. 11. 14. 8–12. Five skulls, of which at least two are female. Shanghai. *Presented by F. W. Styan, Esq.*, 1908.

13. 9. 13. 19. Skull and skin. Hwong-ti-tsze, Hupei; collected by Mr. W. R. Zappey. *By exchange with Museum of Harvard College, U.S.A.*, 1913.

## Section B.—TRAGULINA.

Chevrotains, or Mouse-Deer, as the members of this group are commonly termed, are small artiodactyle ungulates resembling the Pecora (vol. i, p. 8) in the absence of upper incisors and in the possession of the power of ruminating, but differing in that the stomach has only three (in place of four) chambers, and by the complete development of the lateral metacarpals. Horns or antlers are invariably lacking; and the main metacarpals and metatarsals may either remain separate or may be respectively fused into cannon-bones; the fibula of the hind-leg is complete; and the navicular, cuboid, and ectocuneiform elements of the tarsus are united into a single bone. Four teats; placenta diffuse. Face-glands, together with lachrymal pits and vacuities in the skull, invariably wanting, as are also tarsal and metatarsal glands. The feet are of a primitive type, the web on the hind aspect of the pasterns consisting of a fold of skin which stops short midway between the lateral hoofs and the heels; the back of the pasterns being open in its lower half, while the front shows a long triangular depression, with its apex reaching the line of the lateral hoofs. Upper canines in males long and tusk-like (fig. 46).

The range includes the tropical and subtropical forest-tracts of south-eastern Asia and the African equatorial forest-zone.

### Family TRAGULIDÆ.

As this is the only family of the section, its characters may be taken to be the same as those of the latter. It is divisible into the following two generic groups:—

A. Main metacarpals and metatarsals fused, respectively, into cannon-bones, feet relatively long and slender, with the lateral toes small ..... *Tragulus.*

B. Main metacarpals and metatarsals * separate, feet shorter and stouter, with the lateral toes larger... *Dorcatherium.*

## I. Genus TRAGULUS.

Tragulus, *Pallas, Spicil. Zool.* fasc. xiii, p. 27, 1779; *Milne-Edwards, Ann. Sci. Nat. Zool.* ser. v, vol. ii, p. 49, 1864; *Blanford, Fauna Brit. India, Mamm.* p. 554, 1891; *Merriam, Science,* ser. 2, vol. i, p. 375, 1895; *Stone and Rehn, Proc. Ac. Nat. Sci. Philad.* 1902, p. 128; *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol xi, p. 296, 1903; *Pocock, Proc. Zool. Soc.* 1910, p. 979.

Memina, *Gray, Med. Repos.* vol. xv, p. 307, 1821; nec *G. Fischer,* 1814.

Meminna, *Agassiz, Nomenclator Zool., Mamm.* p. 20, 1842; *Gray, List. Mamm. Brit. Mus.* pp. xxvii and 172, 1843.

Size small; main metacarpals and metatarsals fused, respectively, into cannon-bones; feet relatively long and slender; muzzle with a large bare muffle; coat fine and close; with characteristic light markings on throat and chest; skull elongated and compressed anteriorly, with premaxillæ reaching nasals; dentition: *i.* $\frac{0}{3}$, *c.* $\frac{1}{1}$, *p.* $\frac{3}{3}$, *m.* $\frac{3}{3}$, the molars selenodont and short-crowned, and the premolars in apposition with one another and their crowns triangular in profile; tail short or medium.

Restricted to the forest-tracts of south-eastern Asia.

The typical forms of the four species here recognised are respectively characterised as follows:—

A. Upper-parts spotted with white; chin and throat fully haired..... ..... *T. meminna.*

B. Upper-parts not spotted; skin of area between branches of lower jaw bare and glandular.

*a.* General colour tending to dark smoky grey, at least on flanks, size larger, length of hind-foot about $5\frac{5}{8}$ to 6 inches ..... *T. javanicus.*

*b.* General colour, at least on flanks and edges of belly, rufous.

*b'.* General colour bright rufous; nape not darker than back; size medium ..... *T. stanleyanus.*

*c'.* Back greyish, brightening to rufous on flanks; a dark, sometimes black, nuchal stripe; size smaller; length of hind-foot about $4\frac{5}{8}$ to 5 inches..... ..... *T. kanchil.*

* These may more or less completely fuse in old age.

In referring all the unspotted chevrotains (with a possible reservation in the case of one or two forms) to three specific types or groups, the writer follows the lead of Bonhote, who in 1903 stated that he could not agree with those who, while using trinomials for continental races, refuse to allow them for insular races, on the plea that, as intermediate forms do not exist, they must be regarded as separate species. On the contrary, it is in every way much simpler and easier to look upon island forms, which are extraordinarily numerous, in the light of local races, or incipient species, referable to a few variable specific types. When these races are very numerous, this renders it practically impossible to give a full definition of the species, or a "key" to its local forms; and in such cases the only course is to give the leading characteristics of the typical form under the specific heading, and the local variations from this type under the headings of the various races. Even size cannot be taken as a definite specific character, since one of the island forms included under the heading of the larger *T. javanicus* is scarcely superior in stature to the smaller *T. kanchil*.

## I. TRAGULUS MEMINNA.

Moschus meminna, *Erxleben, Syst. Regn. Anim.* p. 322, 1777; *Sykes, Proc. Zool. Soc.* 1831, p. 104; *Elliot, Madras Journ.* vol. x, p. 220, 1839; *Tickell, Calcutta Journ. Nat. Hist.* vol. i, p. 420, 1841; *Blyth, Journ. Asiat. Soc. Bengal*, vol. xi, p. 96, 1842; *Tennent, Nat. Hist. Ceylon*, p. 58, 1861.

Meminna indica, *Gray, Proc. Zool. Soc.* 1836, p. 63, *List Mamm. Brit. Mus.* p. 172, 1843, *Cat. Ungulata Brit. Mus.* p. 246, 1852, *Cat. Ruminants Brit. Mus.* p. 97, 1872, *Hand-List Ruminants Brit. Mus.* p. 167, 1873; *Kelaart, Prodromus Faunæ Zeylan.* p. 81, 1852; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 269, 1862; *Blyth, Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 155, 1863; *Jerdon, Mamm. India*, p. 269, 1867; *McMaster, Notes on Jerdon*, p. 98, 1870; *Sterndale, Mamm. India*, p. 516, 1884.

Tragulus mimenoides, *Hodgson, Journ. Asiat. Soc. Bengal*, vol. x, p. 914, 1841.

Meminna malaccensis, *Gray, List Mamm. Brit. Mus.* p. 172, 1843.

Tragulus meminna,* *Milne-Edwards, Ann. Sci. Nat., Zool.* ser. 5, vol. ii, p. 160, pl. x, 1864; *Blyth, Proc. Zool. Soc.* 1864, p. 483; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 189, 1891; *Thomas, Proc. Zool. Soc.* 1891, p. 385; *Blanford, Fauna Brit. India, Mamm.* p. 555, 1891; *Flower and Lydekker, Study of*

* Frequently spelt *memminna*.

*Mammals*, p. 306, 1893; *Merriam*, *Science*, ser. 2, vol. i, p. 375, 1895; *Lydekker*, *Great and Small Game of India*, *etc.* p. 253, 1900, *Game Animals of India*, *etc.* p. 272, 1907; *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903; *Hauxwell*, *Journ. Bombay Nat. Hist. Soc.* vol. xviii, p. 902, 1908.

Indian Chevrotain, or Mouse-Deer: Memminna.

Typical locality probably southern India; the range includes the larger forests of Peninsular India and Ceylon, and, according to Hauxwell, Burma.

The type species (*vide* Merriam, *op. cit.*).

Size relatively large, shoulder-height 10 to 12 inches, basal skull-length about $3\frac{7}{8}$ inches (97 mm.); no naked

Fig. 46.—Skull of Indian Chevrotain (*Tragulus meminna*).

glandular area on under side of chin and throat; tarsus hairy all round, except behind, close to the hocks; tail short; general colour brown, darker or paler, minutely speckled with yellow; the individual hairs brown at base, black towards end, with a yellow ring a short distance from tip; sides spotted with white or buff on a brown ground, the spots elongate and passing into longitudinal bands; under-parts white; throat with three white stripes, one in the middle pointed in front, and an oblique one on each side.

50, *a*. Skin, young. Madras.

*Presented by Sir Walter Elliot.*

38. 3. 13. 47. Skin, young, formerly mounted. Northern Circars; collected by Mr. J. Turner. *Purchased*, 1838.

42. 5. 26. 19. Skin, formerly mounted. Locality unknown; collected by J. Gould, Esq. Type of *M. malaccensis*. *Purchased*, 1842.

45. 8. 12. 9 (679, *a*). } Skull and skin (formerly mounted),
46. 4. 10. 10. } immature female. Eastern Ghats. Skull figured in Gray's *Catalogue of Ungulata*, 1852.
*Purchased* (*Bartlett*), 1845.

47. 4. 10. 3. Skin, female, formerly mounted. India.
*Purchased* (*Zoological Society*), 1847.

67. 4. 12. 431. Spirit-specimen. Locality unknown.
*Lidth de Jeude Collection, purchased*, 1867.

76. 5. 30. 5. Skull and skin. Peradenya, Ceylon; collected by E. Boate, Esq. *Purchased*, 1876.

77. 3. 14. 1. Skull and skin, female. Kandy, Ceylon; collected by A. Whyte, Esq. *Purchased*, 1877.

77. 11. 1. 8. Skin, young. Same locality and collector.
*Same history.*

79. 11. 21. 588. Skin, immature. Dekhan; collected by Col. T. Sykes. *Transferred from India Museum*, 1879.

79. 11. 21. 657. Skin. Same locality and collector.
*Same history.*

91. 6. 8. 1. Spirit specimen. No locality.
*Presented by Sir W. J. Ingram, Bart.*, 1891.

94. 10. 21. 6. Skin, young. Trivandrum, Travancore.
*Presented by H. S. Ferguson, Esq.*, 1894.

1. * * *. Skull. India.
*Presented by R. Lydekker, Esq.*, 1901.

4. 1. 12. 1. Skin, female, mounted. Ceylon.
*Purchased* (*Gerrard*), 1904.

12. 11. 28. 124. Skin, mounted, and skull. Hulekal, near Sirsi, Kanara; collected by G. C. Shortridge, Esq.
*Presented by the Bombay Natural History Society*, 1912.

12. 11. 28. 125. Skull and skin, female. Same locality and collector. *Same history.*

13. 8. 22. 88. Skull and skin, female. Chamarajnagar, south Mysore; same collector.
*Presented by E. Van Ingen, Esq.*, 1913.

13. 8. 22. 89. Skull and skin, female. Wokkoli, south Coorg; same collector.

*Presented by the Bombay Natural History Society*, 1913.

## II. TRAGULUS STANLEYANUS.

Moschus (Tragulus) stanleyanus, *Gray*, *Proc. Zool. Soc.* 1836, p. 65.
Tragulus stanleyanus, *Gray*, *Knowsley Menagerie*, pl. xxxiii, 1850, *Cat. Ungulata Brit. Mus.* p. 249, 1852, *Cat. Ruminants Brit. Mus.* p. 98, 1872, *Hand-List Ruminants Brit. Mus.* p. 168, 1873, partim; *Milne-Edwards*, *Ann. Sci. Nat.*, *Zool.* ser. 5, vol. ii, p. 160, 1864; *Blyth*, *Proc. Zool. Soc.* 1864, p. 483; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 327, 1884; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, pp. 188 and 191, 1891, partim; *Thomas*, *Proc. Zool. Soc.* 1891, p. 385, *Journ. Malay Mus.* vol. ii, p. 106, 1908; *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Typical locality not definitely known, but probably some part of the Malay Peninsula.

Size medium; a bare glandular area on under side of chin and upper part of throat; general colour typically bright rufous, not darker on neck than on back.

The distribution is probably restricted to the Malay Peninsula and adjacent islands.

The races are distinguished as follows:—

A. General colour rufous.
  *a*. Size larger ..... *T. s. stanleyanus.*
  *b*. Size smaller ..... *T. s. rufulus.*
B. General colour yellower ..... *T. s. perflavus.*
C. General colour orange ..... *T. s. formosus.*

### A.—Tragulus stanleyanus stanleyanus.

Typical locality as above.

Size and colouring as under heading of species.

48. 10. 11. 6. } Skull and skin. Locality unknown.
48. 12. 12. 1 (827, *a*). } Type. Skull figured in Gray's *Catalogue of Ungulata*, 1852.

*Presented by the Earl of Derby*, 1848.

53. 8. 29. 38. Skin, mounted; collected by Mrs. Walkingshaw. Locality unknown.

*Purchased* (*Zoological Society*), 1853.

53. 8. 29. 40. Skin, three days' old fawn. From an animal born in London. *Same history.*

67. 4. 12. 293. Skull, immature female, referable to this or one of the allied races. Locality unknown.
*Lidth de Jeude Collection, purchased,* 1867.

## B.—Tragulus stanleyanus perflavus.

Tragulus perflavus, *Miller, Proc. U.S. Nat. Mus.* vol. xxxi, p. 251, 1906; *Lyon, ibid.* p. 653, 1907, vol. xxxvi, p. 481, 1909.
Tragulus stanleyanus perflavus, *Thomas and Wroughton, Journ. Malay Mus.* vol. iv, p. 128, 1909.

Typical locality Batam Island, Rhio Linga Group.
Type in U.S. National Museum, Washington.
Colour a yellower rufous than in preceding races; area of white throat-markings small. For dimensions see p. 294.

9. 4. 1. 488. Skull and skin. Tanjong Turut, Batam Island; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States,* 1909.

9. 4. 1. 489. Skull and skin. Same locality and collector *Same history.*

9. 4. 1. 490. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 491. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 492. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 493. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 494. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 495. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 496. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 497. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 498. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 499. Skull and skin, female. Same locality and collector. *Same history.*

## C.—Tragulus stanleyanus rufulus.

Tragulus rufulus, *Miller, Proc. Washington Ac. Sci.* vol. ii, p. 227, 1900; *Thomas, Journ. Malay Mus.* vol. ii, p. 106, 1908.

Tragulus javanicus rufulus, *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Tragulus stanleyanus rufulus, *Thomas and Wroughton, Journ. Malay Mus.* vol. iv, p. 129, 1909.

Typical locality Pulo Tioman, off Johore.

Type in U.S. National Museum, Washington.

Similar to typical *T. stanleyanus* in colour, but considerably smaller in size.

8. 1. 25. 24. Skull. Juara Bay, Pulo Tioman. *Presented by H. C. Robinson, Esq.*, 1908.

8. 2. 25. 22. Skull and skin. Pulo Tioman; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1908.

8. 1. 25. 23. Skull and skin, female. Same locality and collector. *Same history.*

## D.—Tragulus stanleyanus formosus.

Tragulus formosus, *Miller, Proc. Biol. Soc. Washington*, vol. xvi, p. 34, 1903, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 251, 1906.

Tragulus javanicus formosus, *Trouessart, Cat. Mamm., Suppl.* p. 688, 1904.

Tragulus stanleyanus formosus, *Thomas and Wroughton, Journ. Malay Mus.* vol. iv, p. 129, 1909.

Typical locality Pulo Bintang, Rhio Linga Group.

Type in U.S. National Museum, Washington.

General colour bright orange ochery, darkening to ochery rufous on neck and limbs, and lightening to orange-buff on flanks; hairs drab with black tips; crown, middle line of nape, and back black, much mingled with ochery rufous, which renders nuchal stripe inconspicuous; under-parts tinged with yellowish drab. For dimensions see p. 294.

9. 4. 1. 484. Skull and skin. Pulo Bintang; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

9. 4. 1. 486. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 487. Skull and skin. Sungei Biru, Pulo Bintang; same collector. *Same history.*

## III. TRAGULUS JAVANICUS.

Cervus javanicus, *Osbeck, Reise Ostind. und China*, p. 367, 1765.

Moschus javanicus, *Raffles, Trans. Linn. Soc.* vol. xiii, p. 262, 1822; *Gray, Proc. Zool. Soc.* 1836, p. 64; nec *Gmelin*, 1788.

Tragulus javanicus, *Gray, List Mamm. Brit. Mus.* p. 173, 1843, *Cat. Ungulata Brit. Mus.* p. 249, 1852, *Cat. Ruminants Brit. Mus.* p. 98, 1872, *Hand-List Ruminants Brit. Mus.* p. 168, 1873; *Cantor, Journ. Asiat. Soc. Bengal*, vol. xv, p. 269, 1846; *Blyth, ibid.* vol. xxvii, p. 277, 1859, *Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 155, 1863; *Bonhote, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 296, 1903.

Tragulus fuscatus, *Blyth, Journ. Asiat. Soc. Bengal*, vol. xxvii, p. 278, 1859.

Tragulus napu, *Milne-Edwards, Ann. Sci. Nat., Zool.* ser. 5, vol. ii, p. 158, 1864, and most later writers.

Typical locality Java.

Size typically large, shoulder-height about 13 inches; a naked tract on throat; tarsus naked behind; tail relatively long; general colour typically yellowish or rufous brown, passing into smoky grey on sides; hairs of back black-tipped, but without pale subterminal ring; forehead and nape blacker; under-parts white; throat and fore part of neck brown, with five more or less distinct white stripes, a median stripe on the chest, and two oblique white lines on each side of front of throat, which may coalesce; rump rufous; tail brown above, white below.

The distributional area extends from Sumatra, Borneo, and Java, together with the neighbouring isles (such as those of the Rhio Linga Group), through the Malay Peninsula and adjacent islands, to southern Tenasserim, as well as to Annam.

### A.—Tragulus javanicus javanicus.

Typical locality Java.

General characters those given under head of species.

No specimen in collection.

## B.—Tragulus javanicus napu.

Moschus napu, *F. Cuvier*, *Hist. Nat. Mamm.* vol. iii, livr. 37, pl. 329, 1822.

Tragulus napu, *Milne-Edwards*, *Ann. Sci. Nat., Zool.* ser. 7, vol. ii, pp. 106 and 158, 1864; *Blyth*, *Proc. Zool. Soc.* 1864, p. 483; *Blanford*, *Journ. Asiat. Soc. Bengal*, vol. xlvii, pt. 2, p. 166, 1879, *Fauna Brit. India*, *Mamm.* p. 557, 1901; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 328, 1884; *Jentink*, *Notes Leyden Mus.* vol. xi, p. 25, 1889; *Thomas*, *Proc. Zool. Soc.* 1886, p. 71, 1891, p. 585; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 190, 1891; *Lydekker*, *Great and Small Game of India, etc.* p. 256, 1900, *Game Animals of India, etc.* p. 275, 1907; *Stone and Rehn*, *Proc. Ac. Nat. Sci. Philadelphia*, 1902, p. 27; *Miller*, *Proc. Biol. Soc. Washington*, vol. xiii, p. 186, 1900, *Proc. U.S. Nat. Mus.* vol. xxvi, p. 439, 1903, vol. xxxvii, p. 6, pl. i, 1909; *Schneider*, *Zool. Jahrb., Syst.* vol. xxiii, p. 133, 1905; *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiv, p. 628, 1908.

Tragulus javanicus napu, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Typical locality Sumatra.

Very similar to typical race; general colour orange-buff, faintly washed with blackish; sides and under-parts greyish; a moderately distinct dark nuchal stripe, throat-markings normal, the outer dark pair similar in colour to rest of neck; total length about 22¼ inches (572 mm.).

51,*b*. Skin, female. Sumatra; collected by Sir J. Stamford Raffles. *Presented by Lady Raffles.*

51,*c*. Skull and skin, immature. Same locality and collector. *Same history.*

79. 11. 21. 243. Skin. Purlis, Malay Peninsula; collected by Dr. J. Cantor.

*Transferred from India Museum*, 1879.

85. 8. 1. 351. Skin. Bankasun, Tenasserim; collected by W. Davison, Esq.

*Presented by A. O. Hume, Esq., C.B.*, 1885.

85. 8. 1. 352. Skin. Same locality and collector.

*Same history.*

85. 8. 1. 353. Skin, female. Probably same locality; same collector. *Same history.*

85. 8. 1. 354. Skin, young. Same locality and collector.

*Same history.*

91. 11. 6. 4. Skin, young. Same locality and collector.

*Presented by Dr. W. T. Blanford*, 1891.

99. 6. 12. 4. Skin, immature female. Deli, Sumatra.
*Presented by Theodore Barclay, Esq.*, 1899.

13. 5. 26. 1. Skin, albino, of this or one of the allied races. Rawang, Malay Peninsula.
*Presented by Mungo Park, Esq.*, 1913.

14. 12. 8. 225. Skull and skin. Bankachon, southern Tenasserim. *Presented by the Bombay Natural History Society*, 1914.

14. 12. 8. 226. Skull and skin. Same locality.
*Same history.*

14. 12. 8. 227. Skull and skin. Same locality.
*Same history.*

14. 12. 8. 228. Skull and skin, female. Same locality.
*Same history.*

14. 12. 8. 229. Skull and skin, female. Same locality.
*Same history.*

14. 12. 8. 230. Skull and skin, female. Same locality.
*Same history.*

## C.—Tragulus javanicus canescens.

Tragulus canescens, *Miller*, *Proc. Biol. Soc. Washington*, vol. xiii, p. 185, 1900, *Proc. U.S. Nat. Mus.* vol. xxxvii, p. 5, foot-note, 1909; *Thomas and Wroughton*, *Ann. Mag. Nat. Hist.* ser. 8, vol. iv, p. 536, 1909.

Tragulus javanicus canescens, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903, *Fasciculæ Malay.* vol. i, p. 41, 1903.

Typical locality Trong, Lower Siam, whence the range extends into the Malay Peninsula.

Type in U.S. National Museum, Washington.

Differs very slightly, if at all, from the Sumatran *T. j. napu;* in the original description comparison was made with one of the Rhio Linga races, instead of the true *napu.*

No specimen in collection.

## D.—Tragulus javanicus borneanus.

Tragulus borneanus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xv, p. 174, 1902; *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiii, p. 550, 1907.

Tragulus javanicus borneanus, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Tragulus napu borneanus, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xl, p. 64, 1911.

Typical locality British North Borneo.

Type in U.S. National Museum, Washington.

Closely allied to *T. j. napu*, but slightly smaller, with the throat-markings a little darker, and the light gorget rather wider. Specimens from the neighbouring Pulo Laut are slightly inferior in size to those from the mainland.

90. 12. 15. 3 (1980, *b*). Skull and skin, female. Sarawak, N. Borneo. *Presented by Dr. G. D. Haviland*, 1890.

92. 2. 8. 6. Skin. Baram, Sarawak; collected by A. H. Everett, Esq. *Purchased*, 1892.

94. 6. 8. 3. Skin, female. Bongon, N. Borneo; same collector. *Purchased*, 1894.

0. 8. 4. 1. Skull and skin, young. Baram. *Presented by Dr. C. Hose*, 1900.

10. 4. 5. 119. Skull and skin; the latter mounted. Poeroek Jihoe, Barito Valley, S. Central Borneo;* collected by G. C. Shortridge, Esq. *Presented by O. Thomas, Esq.*, 1910.

10. 4. 5. 120. Skull and skin. Same locality and collector. *Same history.*

10. 4. 5. 121. Skull and skin. Same locality and collector. *Same history.*

10. 4. 5. 122. Skull and skin, female. Same locality and collector. *Same history.*

10. 4. 5. 123. Skull and skin. Same locality and collector. *Same history.*

10. 4. 5. 124. Skull and skin, female. Same locality and collector. *Same history.*

10. 4. 5. 125. Skull and skin, female. Same locality and collector. *Same history.*

10. 4. 5. 126. Skull and skin, young female. Same locality and collector. *Same history.*

10. 4. 5. 127. Skull and skin, young female. Same locality and collector. *Same history.*

10. 4. 5. 129. Skull and skin. Same locality and collector. *Same history.*

10. 4. 5. 130. Skin. Same locality and collector. *Same history.*

* The reference of the specimens from this locality to the present race is provisional.

## E.—Tragulus javanicus nigricans.

Tragulus nigricans, *Thomas, Ann. Mag. Nat. Hist.* ser. 6, vol. ix, p. 254, 1892; *Nehring, Sitzber. Ges. nat. Freunde*, 1894, p. 223; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 39, 1912.

Tragulus javanicus nigricans, *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Muntiacus nigricans, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xxviii, p. 13, 1916, errorim.

Typical locality Balabac, Philippines.

Size and colour-plan very similar to *T. j. napu*, but upper-parts strongly washed with black, the hairs being white at base, orange in middle, and black at tip; white throat-stripes, when present, very narrow and sharply defined, with an arrangement recalling that obtaining in *T. stanleyanus*, there being a dark area between them and the white on the under side of the lower jaw.

Typical (and only) locality Balabac Island, Philippines.

91. 11. 28. 2. Skull and skin, young. Balabac; collected by the Steere Expedition, 1887–88. Type. *Purchased*, 1891.

94. 2. 1. 16. Skull and skin. Balabac. *Purchased*, 1894.

94. 6. 8. 4. Skull and skin. Balabac; collected by A. H. Everett, Esq. The throat-markings are obsolete. *Purchased*, 1894.

94. 7. 2. 45. Skin, young. Balabac; same collector. *Same history.*

## F.—Tragulus javanicus terutus.

Tragulus canescens terutus, *Thomas and Wroughton, Ann. Mag. Nat. Hist.* ser. 8, vol. iv, p. 536, 1909.

Typical locality Terutau Island, Straits of Malacca.

Smaller than, but otherwise similar to, *T. j. canescens*; the dark on the nape distinctive of *T. j. umbrinus* is wanting.

9. 11. 1. 159. Skull and skin. Terutau Island; collected by H. C. Robinson, Esq. Type. *Presented by the Government of the Federated Malay States*, 1909.

9. 11. 1. 160. Skull and skin, immature. Same locality and collector. *Same history.*

9. 11. 1. 161. Skull and skin. Same locality and collector. *Same history.*

9. 11. 1. 162. Skull and skin, immature. Same locality and collector. *Same history.*

9. 11. 1. 163. Skull and skin of a rather younger animal than the last. Same locality and collector. *Same history.*

9. 11. 1. 164. Skull and skin, subadult female. Same locality and collector. *Same history.*

9. 11. 1. 165. Skull and skin, immature female. Same locality and collector. *Same history.*

## G.—Tragulus javanicus umbrinus.

Tragulus umbrinus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xiii, p. 191, 1900.

Tragulus javanicus umbrinus, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Typical locality Pulo Lankawi, Straits of Malacca.

Type in U.S. National Museum, Washington.

Generally similar to *T. j. canescens*, but smaller and much darker, with the throat-stripes blackish brown and almost devoid of pale speckling, and the under-parts strongly tinged with fulvous grey. General colour deeper and brighter orange-buff than in *T. j. canescens*, and the blackish clouding much in excess of buff; sides and flanks darker than in the latter owing to the greater admixture of brown; entire nape and sides of neck blackish seal-brown; lateral dark throat-stripes of the latter colour, with scarcely any buff speckling.

9. 11. 1. 166. Skull and skin, female. Lankawi Island; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

## H.—Tragulus javanicus pretiosus.

Tragulus pretiosus, *Miller*, *Proc. Ac. Nat. Sci. Philadelphia*, 1902, p. 144, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 253, 1906, vol. xxxvii, p. 6, pl. ii, fig. 1, 1909.

Tragulus javanicus pretiosus, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Typical (and only) locality Linga Island, Rhio Linga Group.

Type in U.S. National Museum, Washington.

Colour richer and yellower than in *T. j. napu;* black clouding on back slightly in excess of ground-colour; a well-defined narrow blackish nuchal stripe; dark throat-markings a mixture of black and dull ochery rufous, white ones normal; total length about 22⅛ inches (566 mm.). For other dimensions, see p. 294.

No specimen in collection.

## I.—Tragulus javanicus pretiellus.

Tragulus pretiellus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 253, 1906, vol. xxxvii, p. 6, 1909.

Tragulus pretiellus pretiellus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xxiv, p. 165, 1911.

Typical (and only) locality Pulo Bakong, Rhio Linga Group.

Type in U.S. National Museum.

Smaller than *T. j. pretiosus*, with relatively larger cheek-teeth; otherwise similar; brighter coloured than *T. j. lutescens* (*infra*); total length about 20 inches (501 mm.). For other dimensions, see p. 294.

No specimen in collection.

## J.—Tragulus javanicus parallelus.

Tragulus pretiellus parallelus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xxiv, p. 165, 1911.

Typical locality Pulo Sebang, Rhio Linga Group.

Type in U.S. National Museum, Washington.

Very close to *T. j. pretiellus*, but with less suffusion of black on upper-parts, and less tinge of buffish on middle portion of under-parts, where there is no greyish grizzle, owing to absence of black tips to hairs.

No specimen in collection.

Here it may be mentioned that *Tragulus formosus* and *T. perflavus*, from the Rhio Linga Group, were originally regarded as members of the present species, more or less nearly related to *T. j. pretiosus*, but are now classed as races of *T. stanleyanus* (*supra*, pp. 266–67).

## K.—Tragulus javanicus lutescens.

Tragulus lutescens, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 32, 1903, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 251, 1906, vol. xxxvii, p. 6. 1909.

Tragulus javanicus lutescens, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 688, 1904.

Pulo Sugi Bawa, Rhio Linga Group; also occurs in Pulo Jan.

Type in U.S. National Museum, Washington.

About the size of *T. j. pretiellus*, with well-defined black nuchal stripe; general colour paler than in preceding races, on back orange-buff clouded with blackish brown, the latter not in excess of former tint; on flanks the buff fading, through straw-yellow to cream; dark throat-markings heavily shaded with black. For dimensions, see p. 294.

No specimen in collection.

## L.—Tragulus javanicus flavicollis.

Tragulus flavicollis, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 33, 1903, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 251, 1906, vol. xxxvii, p. 7, 1909.

Tragulus javanicus flavicollis, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 688, 1904.

Typical (and only) locality Pulo Sugi, Rhio Linga Group.

Type in U.S. National Museum, Washington.

Closely related to preceding race, but yellower, without a dark nuchal stripe, and the dark throat-markings only faintly shaded with black; general colour essentially as in *T. j. lutescens*, but the tawny element more decidedly yellow, especially on cheeks and neck; size probably larger.

No specimen in collection.

## M.—Tragulus javanicus bancanus.

Tragulus bancanus *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 576, 1906.

Typical locality Banka Island, east of Sumatra.

Type in U.S. National Museum, Washington.

Closely related to *T. j. napu*, but brighter in colour, with a rather smaller skull.

No specimen in collection.

### N.—Tragulus javanicus nigricollis.

Tragulus nigricollis, *Miller*, *Proc. Ac. Nat. Sci. Philadelphia*, 1902, p. 145, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 253, 1906, vol. xxxvii, p. 7, pl. iii, fig. 1, 1909.

Tragulus javanicus nigricollis, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 688, 1904.

Typical (and only) locality Pulo Sinkep, Rhio Linga Group.

Type in U.S. National Museum, Washington.

Generally similar to *T. j. pretiosus*, but slightly larger, and ground-colour more clouded with black; flanks light buff, as in *T. j. lutescens;* throat-markings normal, the dark ones black, faintly speckled with brown, like sides of neck; total length about 22¼ inches (566 mm.). For other dimensions, see p. 294.

No specimen in collection.

### O.—Tragulus javanicus nigrocinctus.

Tragulus nigrocinctus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 250, 1906, vol. xxxvii, pl. 7, pl. iii, fig. 2, 1909.

Typical locality Pulu Kundur, Rhio Linga Group; also occurs on Pulu Karimon.

Type in U.S. National Museum, Washington.

General colour much as in *T. j. pretiosus*, but the black clouding—due to the hair-tips—so strongly developed as almost completely to obscure the ground-colour on back; neck and throat black, the latter without markings; no white on under-parts; tail, unlike that of all the other Rhio Linga races, yellow below; total length about 19¾ inches (502 mm.). This race differs from *T. j. annæ* (p. 279) by the shorter ears (length about 30 mm. against 37 to 38 mm.), the marked contrast in colour between neck and back, and the presence of a faint eyebrow-stripe in the lighter-coloured individuals.

9. 4. 1. 476. Skull and skin. Pulo Karimon, Rhio Linga Group; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

9. 4. 1. 477. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 478. Skull and skin. Pulo Kundur; same collector. *Same history.*

9. 4. 1. 479. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 480. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 481. Skull and skin. Same locality and collector. *Same history.*

9. 4. 1. 482. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 483. Skull and skin, female. Same locality and collector. *Same history.*

## P.—Tragulus javanicus sebucus.

Tragulus sebucus, *Lyon, Proc. U.S. Nat. Mus.* vol. xl, p. 64, 1911.

Typical locality Pulo Sebuko, off south-eastern Borneo.

Type in U.S. National Museum, Washington.

Similar in size and general colouring to *T. j. pretiellus*, but blacker above, and the hindmost pair of dark throat-markings almost clear blackish, instead of mingled blackish and ochery. Compared with *T. j. nigricans* (p. 271) the present race is smaller, with a less distinct nuchal stripe, and a considerable difference in the throat-markings. Basal length of skull 90 to 94 mm.

No specimen in collection.

## Q.—Tragulus javanicus billitonus.

Tragulus napu, *melanistic variety, Jentink, Notes Leyden Mus.* vol. xiii, p. 209, 1891; *Willink, Naturk. Tijdschr. Ned.-Ind.* vol. xlv, p. 198, 1905.

Tragulus billitonus, *Lyon, Proc. U.S. Nat. Mus.* vol. xxxi, p. 578, 1906.

Typical locality Billiton Island, east of Sumatra.

Nearly related to *T. j. pretiellus* and *T. j. umbrinus*, but

darker and duller in colour than former, and lacking the bright tint on flanks, neck, and head, and less dark than latter, with a well-defined nuchal stripe instead of a diffused dark colour all over neck.

No specimen in collection.

## R.—Tragulus javanicus amœnus.

Tragulus amœnus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxvi, p. 439, 1903.
Tragulus javanicus amœnus, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 689, 1904.

Typical locality Pulo Mansalar, off Sumatra.

Type in U.S. National Museum, Washington.

A yellowish, dark-necked race, approximating to *T. j. nigricollis*, but smaller and more richly coloured, with normal throat-markings, in which the dark stripes are blackish. General colour orange ochery, darkening towards ochery rufous on legs, and fading to yellow-buff on flanks, with a black suffusion produced by black hair-tips. Basal length of skull 101 to 108 mm.

No specimen in collection.

## S.—Tragulus javanicus jugularis.

Tragulus jugularis, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxvi, p. 440, 1903.
Tragulus javanicus jugularis, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 689, 1904.

Typical locality Pulo Mansalar, off Sumatra.

Type in U.S. National Museum, Washington.

Size much the same as in *T. j. amœnus;* no white anywhere, that portion of the chin which is white in other races being coloured like the cheeks, while the light throat-stripes are indicated only by a stronger grizzling of tawny ochery amid the black; in other respects the general colouring, except on under-parts, inner sides of legs, and lower surface of tail, very nearly as in *T. j. amœnus*, but the neck less speckled with tawny ochery, and cheeks and eyebrow-stripes rather more suffused with black.

No specimen in collection

### T.—Tragulus javanicus annæ.

Tragulus annæ, *Matschie, Sitzber. Ges. nat. Freunde*, 1897, p. 157; *Miller, Proc. U.S. Nat. Mus.* vol. xxxi, p. 250, 1906.
Tragulus javanicus annæ, *Trouessart, Cat. Mamm., Suppl.* p. 689, 1904.

Typical locality unknown.

Type in Berlin Museum.

A small race, with dark chestnut-brown upper-parts, suffused with blackish, due to the black-tipped hairs; neck deep blackish brown, without light bands on fore part, or on anterior part of breast; flanks dirty light brown; under-parts rusty grey, with a narrow blackish brown median stripe.

No specimen in collection.

### U.—Tragulus javanicus bunguranensis.

Tragulus bunguranensis, *Miller, Proc. Washington Ac. Sci.* vol. iii, p. 113, 1901.
Tragulus javanicus bunguranensis, *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Typical locality Bunguran Island, China Sea.

Type in U.S. National Museum, Washington.

Colour-pattern essentially as in *T. j. nigricans*, but size greater and equal that of *T. j. canescens;* general colour uniform ochery, fading to buff on flanks, with the bases of the hairs grey, and both back and flanks distinctly but not excessively darkened by the black hair-tips; throat-markings as in *T. j. nigricans*, but white stripes apparently even more restricted.* Teeth uniformly larger than those of last-named race.

No specimen in collection.

### V.—Tragulus javanicus batuanus.

Tragulus batuanus, *Miller, Smithson. Misc. Collect.* vol. xlv, p. 2, 1903.
Tragulus javanicus ratuanus, *Trouessart, Cat. Mamm., Suppl.* p. 689, 1904, errorim.

Typical locality Batu Island, off Sumatra.

Type in U.S. National Museum, Washington.

* For further details reference may be made to original description.

A large race (basicranial length 102–105 mm.), with wholly black neck and throat-stripes, and the black of the neck extending forwards over the face and cheeks to a greater degree than in any races except *T. j. annæ*, *T. j. jugularis*, and *T. j. bunguranensis*, from all of which the present form is distinguished by the normal pattern of the throat-markings; general colour ochery with a deep shading due to the black hair-tips, neither colour distinctly in excess; on flanks the ochery fading to buff, and the black suffusion rather less pronounced than on back.

No specimen in collection.

### W.—Tragulus javanicus versicolor.

Tragulus versicolor, *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. v, p. 535, 1910.

Typical locality Nhatrang, Annam.

A medium-sized chevrotain distinguishable from other members of the genus by the marked contrast between the colouring of the fore and hind halves of the body, the former being fulvous and the latter grey. Although much smaller than is usual in *T. javanicus*, it seems to be a member of the present group since it has the coarse coat of *T. j. napu*, and cheek-teeth of nearly the same size. In point of size this chevrotain exceeds but little the members of the *T. kanchil* group, which is represented in Annam by *T. k. affinis* (p. 286). Basal length of skull 95 mm.

6. 11. 6. 38. Skull and skin. Nhatrang, Annam; collected by Dr. J. Vassal. Type. *Purchased*, 1906.

6. 11. 6. 39. Skull and skin. Same locality and collector. *Same history.*

10. 3. 10. 6–7. Two skins. Same locality and collector. *Purchased*, 1910.

## IV. TRAGULUS KANCHIL.

Moschus javanicus, *Gmelin*, *Linn.'s Syst. Nat.* vol. i, p. 174, 1788; nec *Osbeck*, 1765.

Moschus kanchil, *Raffles*, *Trans. Linn. Soc.* vol. xiii, p. 262, 1822; *Gray*, *Proc. Zool. Soc.* 1836, p. 64; *Jentink*, *Notes Leyden Mus.* vol. v, p. 181, 1883.

Tragulus kanchil, *Gray, List Mamm. Brit. Mus.* p. 173, 1843; *Cantor, Journ. Asiat. Soc. Bengal*, vol. xv, p. 268, 1846; *Blyth, ibid.* vol. xxvii, p. 276, 1859, *Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 15, 1863, *Proc. Zool. Soc.* 1864, p. 483, *Mamm. and Birds Burma*, p. 44, 1875; *Milne-Edwards, Ann. Sci. Nat., Zool.* ser. 5, vol. ii, pp. 111 and 159, pl. ix, 1864; *Thomas, Proc. Zool. Soc.* 1886, pp. 72 and 79; *Jentink and Büttikofer, Notes Leyden Mus.* vol. xix, p. 64, 1897; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 189, 1891; *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1902; *Stone and Rehn, Proc. Ac. Nat. Sci. Philadelphia*, 1902, p. 128; *Schneider, Zool. Jahrb., Syst.* vol. xxiii, p. 133, 1905; *Miller, Proc. U.S. Nat. Mus.* vol. xxvi, p. 442, 1903, vol. xxxi, p. 56, 1906; *Lyon, ibid.* vol. xxxiv, p. 628, 1908.

Tragulus pygmæus (ex Moschus pygmæus, *Erxleben*), *Gray, Cat. Ungulata Brit. Mus.* p. 250, 1852, *Cat. Ruminants Brit. Mus.* p. 99, 1872 (kanchil).

Tragulus javanicus, *Milne-Edwards, Ann. Sci. Nat., Zool.* ser. 5, vol. ii, pp. 103 and 157, pl. ii, fig. 1, 1864; *Blyth, Proc. Zool. Soc.* 1864, p. 483; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 326, 1884; *Thomas, Proc. Zool. Soc.* 1891, p. 385; *Blanford, Fauna Brit. India, Mamm.* p. 556, 1891; *Flower and Lydekker, Study of Mammals*, p. 305, 1891; *Thomas and Hartert, Novit. Zool.* vol. ii, p. 492, 1895; *Lydekker, Great and Small Game of India, etc.* p. 257, 1900, *Game Animals of India, etc.* p. 276, 1907; *Miller, Proc. Washington Ac. Sci.* vol. iii, p. 115, 1901.

Typical locality Sumatra.

Size relatively small, basal skull-length about 3⅜ inches (85 mm.); a naked glandular area on lower surface of chin and upper part of throat; tarsus bare behind, and carpus almost so; tail relatively long; typically the general colour brown, tending more or less to rufous; back in old individuals nearly black, but always more or less mixed with rufous or yellow, from some of the hairs having a yellow ring near the end; sides paler; nape and upper surface of neck almost or quite black, contrasting with the light brown of sides; under-parts white, variously mixed with light rufous and usually with a median narrow brown or rufous line throughout the breast, in front of this a brown cross-band and on fore part of neck an arrowhead-like brown mark, sometimes incomplete, with three white stripes, one median, within the arrow-head, the other two diverging, one on each side, outside of it, the last two joining on throat; rump rufous, insides of thighs and intermediate space white; tail rufous-brown above, white below.

Distribution very similar to that of the preceding species, but including Cambodia and Cochin China.

### A.—Tragulus kanchil kanchil.

Tragulus kanchil kanchil, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiv, p. 628, 1908.

Typical locality Sumatra.

General characters those of the species.

1361, *a*. Skeleton, female, mounted. Sumatra. *Purchased* (*Warwick*).

79. 6. 28. 19. Two skins. Pajo, Sumatra; collected by Herr Karl Bock. *Purchased*, 1879.

### B.—Tragulus kanchil longipes.

Tragulus kanchil longipes, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiv, p. 628, 1908, vol. xl, p. 66, 1911.

Typical locality, Little Siak Valley, eastern Sumatra.

Type in U.S. National Museum, Washington.

Distinguished from typical race by greater length of hind-foot, which ranges from 131 to 145 mm. against from 114 to 128 mm. in the former.

Whether such slight differences as distinguish this and the next form from the typical race are worthy of recognition, is very questionable.

No specimen in collection.

### C.—Tragulus kanchil luteicollis.

Tragulus kanchil, *Jentink*, *Notes Leyden Mus.* vol. xiii, p. 209, 1891.
Tragulus luteicollis, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 579, 1906.

Typical locality Banka Island, east of Sumatra.

Type in U.S. National Museum, Washington.

Distinguished from typical race by slightly larger size (basal skull-length 85–91 mm., against 84–83 mm.), generally duller colour, especially on sides of head and neck, and less black on upper-parts. General colour mixed dull ochery or

orange-buff and black, but nuchal stripe almost wholly black flanks with less black, and the ochery buff paler.

No specimen in collection.

## D.—Tragulus kanchil subrufus.

Tragulus subrufus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 39, 1893, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 254, 1906.

Tragulus kanchil subrufus, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 690, 1904.

Typical locality Sinkep Island, Rhio Linga Group; also found on Linga Island.

Very similar to typical race, but general colour slightly more yellow, and under-parts much more strongly suffused with fulvous; ground colour orange-buff, slightly more yellow than that of *T. k. kanchil*, but less bright than in *T. k. natunæ*.

For dimensions, see p. 294.

No specimen in collection.

## E.—Tragulus kanchil rubeus.

Tragulus rubeus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 40, 1903, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 254, 1906.

Tragulus kanchil rubeus, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 690, 1904; *Thomas and Wroughton*, *Journ. Malay Mus.* vol. iv, p. 128, 1910.

Typical locality Pulo Bintang, Rhio Linga Group.

Type in U.S. National Museum, Washington.

Similar to *T. k. subrufus*, but brighter coloured, and with rather larger skull and cheek-teeth.

For dimensions, see p. 294.

9. 4. 1. 502. Skull and skin, female. Pulo Bintang; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

9. 4. 1. 503. Skull and skin, female. Same locality and collector. *Same history.*

9. 4. 1. 504. Skull and skin, female. Same locality and collector. *Same history.*

### F.—Tragulus kanchil fulvicollis.

Tragulus fulvicollis, *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiv, p. 650, 1908.

Typical locality Pulo Bengkalis, off Sumatra.

Type in U.S. National Museum, Washington.

Distinguished from typical *T. kanchil* by its larger size and lighter colour.

No specimen in collection.

### G.—Tragulus kanchil carimatæ.

Tragulus carimatæ, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxxi, p. 55, 1906; *Lyon*, *ibid.* vol. xl, p. 67, 1911.

Typical locality Karimata Island, between Borneo and Billiton; the range also including Pulo Panebangan.

Distinguished from typical race by the slightly larger and broader skull, and the distinctly stouter cheek-teeth. There is a tendency to a stronger suffusion of buff on the underparts and to the more pronounced development of the nuchal stripe.

No specimen in collection.

### H.—Tragulus kanchil brevipes.

Tragulus brevipes, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxvi, p. 443, 1903.

Tragulus kanchil brevipes, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 689, 1904.

Typical locality Pulo Bangkaru, near Sumatra.

Type in U.S. National Museum, Washington.

Differs from typical race by the much shorter ears and feet, the paler colouring, and the slender muzzle of skull; general colour a fine grizzle of black and light orange-buff, with the former tint somewhat predominating; flanks buffish yellow slightly suffused with black; outer sides of legs bright orange-buff; nuchal stripe clear black, contrasting with the slightly grizzled dull orange-buff of sides of neck;

throat-markings normal, the brown stripes strongly grizzled, darker than sides of neck, and confluent in front. The small feet and pale colouring approximate to *T. k. pallidus*, which is, however, still paler, with a short and stout muzzle to skull.

No specimen in collection.

## I.—Tragulus kanchil pallidus.

Tragulus pallidus, *Miller*, *Proc. Washington Ac. Sci.* vol. iii, p. 116, 1901.

Tragulus kanchil pallidus, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Typical locality Pulo Laut, S. China Sea.

Type in U.S. National Museum, Washington.

Smaller and paler than typical race, with the black clouding of upper-parts inconspicuous, but the dark nuchal stripe well defined; general colour light ochery buff, faintly clouded by the black hair-tips, and more strongly so on mid-dorsal line and across loins.

No specimen in collection.

## J.—Tragulus kanchil fulviventer.

Tragulus fulviventer, *Gray*, *Proc. Zool. Soc.* 1836, p. 65, *Cat. Ruminants Brit. Mus.* p. 98, 1872 (partim), *Hand-List Ruminants Brit. Mus.* p. 168, 1873 (partim); *Stone and Rehn*, *Proc. Ac. Nat. Sci. Philadelphia*, 1902, p. 131; *Miller*, *Proc. U.S. Nat. Mus.* vol. xxvi, p. 445, 1903.

Tragulus kanchil fulviventer, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7. vol. xi, pp. 292 and 296, 1903; *Thomas and Wroughton*, *Journ. Malay Mus.* vol. iv, p. 128, 1810.

Typical locality apparently Singapore.

Much smaller than typical race, with the under-parts suffused with fulvous ochery, the brown throat-markings relatively deep in colour, with a rufous transverse stripe under the throat at the apex of the triangular patterned area, connecting the colour at either side of neck, and the white stripes strongly developed; skull intermediate between that of *T. k. hosei* and that of *T. k. affinis*.

52, *a*. Skull and skin. Singapore (?).*
*Bequeathed by Gen. T. Hardwicke*, 1835.

53, *a*. Skull and skin. Singapore (?).* Type.
*Same history.*

53, *b*. Skin, immature. Singapore (?).* *Same history.*

85. 8. 1. 363. Skin, female, mounted. Singapore; collected by W. Davison, Esq.
*Presented by A. O. Hume, Esq., C.B.*, 1885.

85. 8. 1. 364. Skin, young. Same locality and collector.
*Same history.*

9. 4. 1. 500. Skull and skin. Changi, Singapore; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

9. 4. 1. 501. Skull and skin, female. Same locality and collector. *Same history.*

## K.—Tragulus kanchil affinis.

Tragulus affinis, *Gray*, *Proc. Zool. Soc.* 1861, see also *Hand-List Ruminants Brit. Mus.* p. 169, 1873, where this form is included under the heading of *T. fulviventer*.

(?) Tragulus ravus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xv, p. 163, 1902, vol. xvi, p. 41, 1903.

Tragulus kanchil affinis, *Bonhote*, *Ann. Mag. Nat. Hist.* ser. 7, vol. xi, pp. 293 and 296, 1903, *Fascic. Malay.* vol. i, p. 42, 1903; *Thomas*, *Ann. Mag. Nat. Hist.* ser. 8, vol. v, p. 536, 1910.

Typical locality probably the northern part of the Malay Peninsula or Tenasserim (not, as stated by Gray, Singapore).

*T. ravus*, from Trong, Lower Siam, was identified with this race by Bonhote, who stated that specimens from the Malay Peninsula were inseparable from the type of *T. affinis*. Thomas has, however, suggested that the latter may be a more southern type, in which case *ravus* will have to stand for the northern form.

Slightly smaller and paler than *T. k. fulviventer*, without the transverse rufous stripe; skull with the auditory bullæ smaller and less inflated than in *T. k. hosei* (p. 298), in which the whole skull is smaller.

38. 7. 13. 2 (853, *e*). Skin, immature. Malay Peninsula (?).
*Purchased* (*Stevens*), 1838.

* Not Java, as originally stated.

38. 8. 1. 13 (853, *i*). Skin, female. Malay Peninsula. Type. *Purchased* (*Sotherby*), 1838.

79. 11. 21. 244. Skin, female. Malay Peninsula; collected by Dr. J. Cantor. *Transferred from India Museum*, 1879.

85. 8. 1. 355. Skull and skin. Bankachon, southern Tenasserim; collected by W. Davison, Esq. *Presented by A. O. Hume, Esq., C.B.*, 1885.

85. 8. 1. 356. Skull and skin. Same locality and collector. *Same history.*

85. 8. 1. 357. Skin. Same locality and collector. *Same history.*

85. 8. 1. 358. Skull and skin. Same locality and collector. *Same history.*

85. 8. 1. 361. Skull and skin. Salanga Island, off Malay Peninsula; same collector. *Same history.*

85. 8. 1. 362. Skull and skin. Taroa, Malay Peninsula; same collector. *Same history.*

3. 2. 6. 79. Skull and skin, female. Biserak, Jalor, Malay Peninsula. *Presented by H. C. Robinson, Esq.*, 1903.

3. 2. 6. 80. Skull and skin, female. Same locality. *Same history.*

4. 4. 7. 7. Skull and skin. Siracha, Siam. Practically a topo-type of *T. ravus*. *Presented by T. H. Lyle, Esq.*, 1904.

6. 10. 4. 44. Skull and skin, female. Kuala Tembeling, Pahang, Malay Peninsula; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1906.

6. 11. 6. 40. Skull and skin. Nhatrang, Annam; collected by Dr. J. Vassal. *Purchased*, 1906.

8. 3. 9. 22. Skin. Near Moulmein, Tenasserim. *Presented by Mrs. W. T. Blanford*, 1908.

14. 12. 8. 231. Skull and skin. Bankachon, southern Tenasserim. *Presented by the Bombay Natural History Society*, 1914.

14. 12. 8. 232. Skull and skin. Same locality. *Same history.*

14. 12. 8. 233. Skull and skin. Same locality. *Same history.*

14. 12. 8. 234. Skull and skin. Same locality. *Same history.*

14. 12. 8. 235. Skull and skin, female. Same locality. *Same history.*

14. 12. 8. 236. Skull and skin, female. Same locality. *Same history.*

14. 12. 8. 237. Skull and skin, female. Same locality. *Same history.*

## L.—Tragulus kanchil ravulus.

Tragulus ravulus, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 41, 1903.

Tragulus kanchil ravulus, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 689, 1904.

Typical locality Pulo Adang, Butang Group, off Malay Peninsula.

Type in U.S. National Museum, Washington.

Similar to *T. k. affinis* (*ravus*), but smaller, with the neck paler and the nuchal stripe less pronounced.

No specimen in collection.

## M.—Tragulus kanchil lancavensis.

Tragulus lancavensis, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 41, 1903.

Tragulus kanchil lancavensis, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 690, 1904.

Typical locality Pulo Langkawi, Straits of Maladoa.

Type in U.S. National Museum, Washington.

Similar to *T. k. affinis* (*ravus*), but general colour slightly more yellow, and under-parts strongly suffused with orange-buff; upper-parts bright ochery buff, with a yellow tinge.

9. 11. 1. 167. Skull and skin. Pulo Langkawi; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

9. 11. 1. 168. Skull and skin, female. Same locality and collector. *Same history.*

9. 11. 1. 169. Skull and skin, female. Same locality and collector. *Same history.*

## N.—Tragulus kanchil lampensis.

Tragulus lampensis, *Miller*, *Proc. Biol. Soc. Washington*, vol. xvi, p. 42, 1903.

Tragulus kanchil lampensis, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 690, 1904.

Typical locality Pulo Lampi, Mergui Archipelago.

Type in U.S. National Museum, Washington.

Similar to *T. k. lancavensis*, but general colour much more yellow, and under-parts strongly suffused with bright orange-buff.

No specimen in collection.

## O.—Tragulus kanchil russeus.

Tragulus russeus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xvi, p. 444, 1903.
Tragulus kanchil russeus, *Trouessart*, *Cat. Mamm., Suppl.* p. 689, 1904.

Typical locality Pulo Tuangku, Banjak Group, off N.W. Sumatra.

Type in U.S. National Museum, Washington.

Generally similar, both in size and colouring to *T. k. fulviventer*, but the brown throat-stripes less dark, and the light ones frequently nearly obsolete, and in some cases wanting; general colour orange-ochery, somewhat paler on flanks, and darkening to raw-sienna on neck and outer sides of legs; back with a black suffusion (due to hair-tips), predominating over the ochery, and deepening on shoulders into a clear black nuchal stripe; on neck and flanks the suffusion much less and disappearing on lower part of latter, where the colour passes into the raw sienna of the legs and the pale orange-ochery suffusing the under-parts; region usually occupied by white throat-stripes with a peculiar mottled appearance due to the white being mostly replaced by clear orange-ochery, not contrasting strongly with gorget and dark stripes, both of which are distinctly grizzled, like sides of neck.

No specimen in collection.

## P.—Tragulus kanchil russulus.

Tragulus russulus, *Miller*, *Smithson. Misc. Collect.* vol. xlv, p. 3, 1903.
Tragulus kanchil russulus, *Trouessart*, *Cat. Mamm., Suppl.* p. 689 1904.

Typical locality Batu Island, near Sumatra.

Near akin to *T. k. russeus*, but the general colour less dark, a less extensive yellowish suffusion on under-parts,

and throat-markings invariably normal in pattern; skull and teeth rather smaller than in *T. k. russeus;* general colour rather dark orange-ochery; neck and limbs brighter than body, dark clouding on back only slightly developed, but deepening anteriorly into a faintly grizzled black nuchal stripe.

No specimen in collection.

### Q.—Tragulus kanchil hosei.

Tragulus kanchil hosei, *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 293, 1903.

Tragulus virgicollis, *Miller, Proc. Biol. Soc. Washington*, vol. xvi, p. 37, 1903.

Tragulus kanchil virgicollis, *Trouessart, Cat. Mamm., Suppl.* p. 690, 1904.

Tragulus hosei, *Lyon, Proc. U.S. Nat. Mus.* vol. xxxiii, p. 549, 1907.

Typical locality Baram Valley, Sarawak, Borneo.

Distinguished from *T. k. fulviventer* by its superior size, rather paler colouring, and absence of orange throat-band; general colour black strongly grizzled with rufous, which becomes yellower and predominant on flanks; skull (basal length 86 mm.) with very large and much inflated auditory bullæ, but otherwise very similar to that of *T. k. affinis*, although larger.

79. 5. 23. 3. Skull and skin. Sarawak; collected by A. H. Everett, Esq. *Purchased (Gerrard)*, 1879.

79. 5. 23. 7. Skeleton, female, mounted. Same locality and collector. *Same history.*

79. 5. 23. 8. Skeleton, female. Same locality and collector. *Same history.*

0. 8. 4. 10. Skull and skin, female. Baram Valley. Type. *Presented by Dr. C. Hose*, 1900.

8. 7. 17. 21. Skull and skin, female. Borneo; collected by Dr. C. Hose.
*Presented by the British North Borneo Co.*, 1908.

8. 7. 17. 22. Skull and skin. Same locality and collector. *Same history.*

8. 7. 17. 23. Skull and skin. Same locality and collector. *Same history.*

10. 4. 5. 128. Skull and skin. Moera Island, Barito River, south-central Borneo; collected by G. C. Shortridge, Esq. *Presented by O. Thomas, Esq.*, 1910.

## R.—Tragulus kanchil everetti.

Tragulus kanchil everetti. *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 295, 1903.

Tragulus natunæ, *Miller, Proc. Biol. Soc. Washington*, vol. xvi, p. 38, 1903.

Tragulus kanchil natunæ, *Trouessart, Cat. Mamm., Suppl.* p. 690, 1904.

Typical locality Bunguran Island, Natuna Group.

Generally similar to *T. k. hosei*, but rather smaller, and richer in colour, the flanks being rufous instead of deep buff; skull rather smaller (basal length 83 mm.), with larger cheek-teeth, much smaller auditory bullæ, and the premaxillæ continuing of the same width for some distance in advance of nasals, and then bending sharply downwards, instead of sloping gradually downwards as in *T. k. affinis*, or narrowing abruptly as in *T. k. hosei*.

Miller described his *T. natunæ* as similar to typical race but smaller and yellower, the ground-colour of the back being bright tawny ochre instead of yellowish buff, and the black clouding not in excess of the lighter colour.

94. 9. 28. 21. Skull and skin, female. Bunguran Island; collected (October) by A. H. Everett, Esq. Type.
*Purchased*, 1894.

## S.—Tragulus kanchil pierrei.

Tragulus kanchil pierrei, *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 293, 1903.

Typical locality Bien Hoa, lower Cochin China.

Nearly related to *T. k. affinis*, with which it agrees in size, but general colour of a uniform dull yellowish brown, without any admixture of black; this sufficing to distinguish it from all other races described up to April, 1903. Basal length of skull 76 mm.

61. 4. 12. 6. Young skin, mounted. Cambodia; collected by Monsieur Mohot, 1859. *Purchased*, 1861.

61. 4. 12. 7. Skin, mounted. Same locality and collector. *Same history.*

61. 4. 12. 20 (853, *f*). Skull. Pachebone, Cambodia; same collector. *Same history.*

78. 6. 17. 18. Skull and skin. Bien Hoa, lower Cochin China. Type. *Presented by Monsieur Pierre*, 1878.

## T.—Tragulus kanchil pelandoc.

Moschus javanicus, *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 174, 1788; *nec* Cervus javanicus, *Osbeck.*

Moschus pelandoc, *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 66, 1827.

Tragulus pelandoc, *Blyth, Journ. Asiat. Soc. Bengal*, vol. xxvii, p. 277, 1858; *Stone and Rehn, Proc. Ac. Nat. Sci. Philadelphia*, 1902, p. 131; *Miller, Proc. Biol. Soc. Washington*, vol. xvi, p. 37, 1905.

Tragulus kanchil pelandoc, *Bonhote, Ann. Mag. Nat. Hist.* ser. 7, vol. xi, p. 296, 1903.

Tragulus focalinus, *Miller, Proc. Biol. Soc. Washington*, vol. xvi, p. 35, 1905.

Tragulus kanchil focalinus, *Trouessart, Cat. Mamm., Suppl.* p. 690, 1904.

Typical locality Java.

Miller has stated that Hamilton Smith's *Moschus pelandoc* cannot be definitely identified, but that it appears to be nearly allied to the typical Sumatran *T. kanchil;* and he accordingly proposed a new name for such specimens of Javan kanchils as came under his observation. Until, however, the so-called *T. focalinus* can be definitely proved to be distinct from *T. k. pelandoc,* it may be regarded as inseparable therefrom.

A grey-necked race specially characterised by the great width and distinctiveness of the tawny eyebrow-stripes and the contrast between the grizzled grey of the neck and the tawny head and body; no dark nuchal stripe; throat-markings normal. General colour raw-sienna, gradually paling, through buff, to creamy buff on flanks; hairs drab with black tips, the latter producing a faint dark clouding on back but not on flanks; neck coarsely grizzled grey, the hairs black with a buffish terminal or subterminal ring; crown blackish, its hair with inconspicuous tawny annulations; skull with a shorter muzzle and narrower auditory bullæ than in typical race.

Bonhote remarked that one specimen which came under his notice resembled the type of the present race on the throat and the typical *kanchil* on the nape.

51 *a*, 52. Two skins of fawns. Java; collected by Dr. T. Horsfield. *Presented by the Hon. East India Co.*

9. 1. 5. 834. Skull and skin. Pangandaran, Dirk-de-Vries Bay, Java; collected by G. C. Shortridge, Esq.
*Presented by W. E. Balston, Esq.*, 1909.

9. 1. 5. 837. Skull and skin. Same locality and collector.
*Same history.*

9. 1. 5. 838. Skull and skin. Same locality and collector.
*Same history.*

9. 1. 5. 839. Skull and skin. Same locality and collector.
*Same history.*

9. 1. 5. 840. Skull and skin, female. Same locality and collector. *Same history.*

9. 1. 5. 841. Skull and skin, female. Same locality and collector. *Same history.*

9. 1. 5. 842. Skin, female, mounted. Same locality and collector. *Same history.*

9. 1. 5. 843. Skull and skin, female. Same locality and collector. *Same history.*

9. 1. 5. 844. Skull and skin, very young female. Same locality and collector. *Same history.*

9. 1. 5. 845. Skull and skin, female. Same locality and collector. *Same history.*

9. 1. 5. 847. Skull and skin, female. Same locality and collector. *Same history.*

9. 1. 5. 848. Skull and skin, very young female. Same locality and collector. *Same history.*

9. 1. 5. 850. Skull and skin. Batavia, Java; same collector. *Same history.*

9. 1. 5. 851. Skull and skin, female. Tassik-malaja, Preanger, Java; same collector. *Same history.*

9. 1. 5. 852. Skull and skin, female. Tjilatjap, Java; same collector. *Same history.*

9. 1. 5. 853. Skull and skin, female. Same locality and collector. *Same history.*

### Racially Undetermined Specimens, of which the Localities are unknown.

45. 11. 24. 2. Skin. *Purchased* (*Thomas*), 1845.

47. 4. 30. 3.
47. 4. 30. 9 (679, *b*). } Skin, mounted, and imperfect skeleton, immature female.
*Purchased* (*Zoological Society*), 1847.

48. 11. 5. 2 (853, *b*). Skull, female. *No history.*

50. 11. 22. 28 (853, *a*). Skull, immature.
*Purchased* (*Zoological Society*), 1850.

53. 8. 29. 39. Skin, five-days'-old fawn.
*Purchased* (*Zoological Society*), 1853.

56. 5. 6. 67. Skull. *Presented by W. Theobald, Esq.*, 1856.

60. 3. 18. 29 (853, *h*). Skeleton, female, mounted.
*Purchased* (*Zoological Society*), 1860.

67. 4. 12. 294–6–7. Three skulls, immature.
*Lidth de Jeude Collection, purchased*, 1867.

68. 12. 29. 36 (853, *g*). Skeleton, mounted.
*Purchased* (*Zoological Society*), 1886.

Measurements, in Millimetres, of Adult Rhio-Linga Chevrotains.

(From Miller.)

| Name. | Locality. | Sex. | Total length. | Head and body. | Tail. | Hind foot. | Hind foot without hoofs. |
|---|---|---|---|---|---|---|---|
| *T. stanleyanus formosus.* | Pulo Bintang | Male | 620 | 540 | 80 | 142 | 129 |
| ,, ,, | ,, | ,, | 600 | 530 | 70 | 137 | 124 |
| ,, ,, | ,, | Female | 650 | 570 | 80 | 143 | 129 |
| ,, ,, | ,, | ,, | 693 | 593 | 100 | 145 | 131 |
| *T. javanicus lutescens* | Pulo Sugi Bawa | ,, | 600 | 510 | 90 | 131 | 117 |
| ,, ,, | ,, | Male | 563 | 488 | 75 | 131 | 117 |
| ,, ,, | Pulo Jan | Female | 592 | 505 | 87 | 129 | 115 |
| ,, ,, | ,, | Male | 575 | 503 | 72 | 130 | 118 |
| *T. stanleyanus perflavus.* | Pulo Batam | Female | 620 | 535 | 85 | 135 | 122 |
| *T. javanicus pretiosus* | Linga | Male | 625 | 545 | 80 | 135 | 120 |
| ,, ,, | ,, | Female | 628 | 548 | 80 | 138 | 124 |
| ,, ,, | ,, | ,, | 675 | 565 | 90 | 140 | 125 |
| *T. javanicus pretiellus* | Pulo Bakong | ,, | 605 | 515 | 90 | 122 | 108 |
| ,, ,, | ,, | ,, | 575 | 500 | 75 | 123 | 107 |
| ,, ,, | ,, | Male | 533 | 473 | 60 | 119 | 105 |
| ,, ,, | Pulo Sebang | ,, | 615 | 535 | 80 | 135 | 119 |
| ,, ,, | ,, | ,, | 610 | 525 | 85 | 138 | 123 |
| *T. javanicus nigrocinctus* | Pulo Kundur | ,, | 575 | 490 | 85 | 137 | 122 |
| ,, ,, | ,, | ,, | 625 | 525 | 100 | 142 | 128 |
| ,, ,, | ,, | Female | .. | 537 | .. | 137 | 120 |
| ,, ,, | ,, | ,, | 598 | 513 | 85 | 140 | 126 |
| *T. javanicus nigricollis* | Sinkep | Male | 620 | 540 | 80 | 138 | 123 |
| ,, ,, | ,, | ,, | 655 | 570 | 85 | 143 | 130 |
| ,, ,, | ,, | Female | 645 | 560 | 85 | 143 | 128 |
| ,, ,, | ,, | ,, | 670 | 590 | 80 | 147 | 133 |
| *T. kanchil rubeus* | Pulo Bintang | Male | 540 | 465 | 75 | 119 | 106 |
| ,, ,, | ,, | ,, | 612 | 547 | 65 | 118 | 105 |
| ,, ,, | ,, | Female | 543 | 478 | 65 | 125 | 113 |
| *T. kanchil subrufus* | Sinkep | ,, | 540 | 470 | 70 | 125 | 113 |
| ,, ,, | ,, | Male | 528 | 450 | 78 | 118 | 108 |
| ,, ,, | Linga | ,, | 500 | 450 | 50 | 119 | 105 |
| ,, ,, | ,, | Female | 500 | 450 | 50 | 118 | 105 |

These measurements, which are only a few of those given by Miller, will serve as a standard in cases when other races are contrasted with the above in the matter of size.

## II. Genus DORCATHERIUM.

Dorcatherium, *Kaup*, *Oss. Foss. Darmstadt*, pt. 5, p. 92, 1836; *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. x, pt. 2, p. 72, 1883; *Lydekker*, *Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 153, 1885; *Thomas*, *Proc. Zool. Soc.* 1891, p. 385.

Hyemoschus, *Gray*, *Ann. Mag. Nat. Hist.* ser. 1, vol. xvi, p. 350 1845, *Cat. Ruminants Brit. Mus.* p. 96, 1872.

Hyomoschus, *Garrod*, *Proc. Zool. Soc.* 1878, p. 682; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 329, 1884.

Hyœmoschus, *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. x, pt. 2, p. 78, 1883.

Size larger than in *Tragulus;* main metacarpals and metatarsals separate, or the latter alone uniting partially or wholly into a cannon-bone in old age; feet shorter and stouter with larger lateral toes; skull relatively short, with premaxillæ not reaching nasals; dentition: $i.\ \frac{0}{3}$, $c.\ \frac{1}{1}$, $p.\ \frac{3}{3-4}$, $m.\ \frac{3}{3}$; tail medium.

Typified by *D. naui* (Kaup, *op. cit.* 1836) from the Upper Tertiary of Eppelsheim, Hesse-Darmstadt, which differs from the existing species by the presence (at any rate in many cases) of the first lower premolar.

At the present day the genus is restricted to the equatorial forest-zone of Africa.

### DORCATHERIUM AQUATICUM.

Moschus aquaticus, *Ogilby*, *Proc. Zool. Soc.* 1840, p. 35, 1841, p. 68; *Owen*, *Anat. Vertebrates*, vol. ii, p. 487, 1866.

Hyemoschus aquaticus, *Gray*, *Ann. Mag. Nat. Hist.* ser. 1, vol. xvi, p. 350, 1845, *Knowsley Menagerie*, p. 42, pl. xxxi, 1850, *Cat. Ungulata Brit. Mus.* p. 248, 1852, *Cat. Ruminants Brit. Mus.* p. 99, 1872, *Hand-List Ruminants Brit. Mus.* p. 169, 1873; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 269, 1862; *Milne-Edwards*, *Ann. Sci. Nat., Zool.* ser. 5, vol. ii, p. 133, 1864.

Hyomoschus aquaticus, *Garrod*, *Proc. Zool. Soc.* 1878, p. 682; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 329, 1884; *Jentink*, *Notes Leyden Mus.* vol. x, p. 26, 1887; *Pousargues*, *Ann. Sci. Nat., Zool.* ser. 7, vol. iv, p. 87, 1897.

Hyœmoschus aquaticus, *Rütimeyer*, *Abh. schweiz. pal. Ges.* vol. x, pt. 2, p. 78, 1883.

Dorcatherium aquaticum, *Thomas*, *Proc. Zool. Soc.* 1891, p. 385; *Flower and Lydekker*, *Study of Mammals*, p. 306, 1891; *Lydekker*, *Great and Small Game of Africa*, p. 515, 1899, *Game Animals of Africa*, p. 386, 1908.

WATER-CHEVROTAIN.

Typical locality Sierra Leone, West Africa.

The only existing species; type of *Hyemoschus*.

Shoulder-height about 13 to 14 inches; three pairs of lower premolars; tail rather bushy; general colour olive to chestnut-brown, profusely spotted and striped on the body with white or yellow, the thick and irregular stripes being longitudinal and for the most part restricted to the flanks; throat and upper part of chest with light and dark markings comparable with those of *Tragulus;* tail white below.

Distribution, at the present day, co-extensive with that of genus.

The following races have been named:—

A. General colour dark olive, with very little speckling except on neck; light markings on back white and distinct..... *D. a. aquaticum.*

B. General colour more rufous, heavily speckled all over upper-parts; light markings on back straw-coloured and indistinct.

*a*. General colour darker rufous, with light markings extending on to shoulders, and face with distinct dark chevron ..... *D. a. batesi.*

*b*. General colour lighter rufous, with light markings stopping short of shoulders, and face without distinct dark chevron ..... *D. a. cottoni.*

## A.—Dorcatherium aquaticum aquaticum.

Dorcatherium aquaticum typicum, *Lydekker*, *Proc. Zool. Soc.* 1906, vol. i, p. 113.

Typical locality Sierra Leone.

General colour dark olive, without any distinct speckling except on neck; light markings on back white, distinct, and numerous; face dark in middle line, elsewhere olive-brown with a tinge of rufous, a distinct white flank-band running from shoulders along flanks to join transverse loin-band, and two flank-bands below this; spots on back forming distinct and continuous transverse bands; tail with much brown above.

44. 8. 22. 1. } Skin, mounted, and skull, imma-
44. 9. 5. 1 (680, *a*). } ture female. Sierra Leone; collected by Mr. J. Whitfield. *Presented by the Earl of Derby*, 1844.

44. 9. 7. 1. } Skin, mounted, skull, and scapulæ.
46. 2. 28. 1 (680, *b*). } Same locality and collector. Type. *Same history.*

46. 11. 2. 1 (680, *d*). Skull and limb-bones. Gambia; same collector. *Same history.*

46. 11. 2. 3 (680, *g*). Skull and skin, young. Same locality and collector. *Same history.*

46. 11. 19. 10 (680, *e*). Skeleton, immature. Sierra Leone; same collector. *Same history.*

680, *e*. Skeleton. Gambia.
*Purchased* (*Zoological Society*), 1854.

58. 5. 4. 452 (680, *f*). Skeleton. Gambia.
*Purchased* (*Zoological Society*), 1858.

14. 1. 19. 3. Skin, mounted, and skull, female. Ashanti.
*Presented by the Zoological Society*, 1914.

13. 11. 21. 16. Body-skin. Mount Barclay, Liberia; collected by R. H. Bunting, Esq. *Purchased*, 1913.

## B.—Dorcatherium aquaticum batesi.

Dorcatherium aquaticum batesi, *Lydekker*, *Proc. Zool. Soc.* 1906, vol. i, p. 113.

Typical locality Cameruns. General colour rufous brown, heavily speckled all over upper-parts; light markings on upper surface yellowish and indistinct; face with a blackish chevron running from muzzle to eyes; a distinct yellowish flank-band joining transverse rump-band; tail brown at base with little white at tip.

5. 5. 23. 26. Skull and skin. Efulen, Cameruns; collected by G. L. Bates, Esq. Type. *Purchased*, 1905.

6. 4. 4. 1. Skin. Afikpo, Cross River, Southern Nigeria.
*Presented by J. C. Cotton, Esq.*, 1906.

7. 11. 19. 4. Skin (scalp separate). Oban, 40 miles from Calabar, Southern Nigeria; collected by P. A. Talbot, Esq. *Presented by Mrs. P. A. Talbot*, 1907.

8. 6. 28. 3. Skin. Same locality and collector.
*Purchased*, 1908.

12. 10. 28. 57. Skull and skin, young female. Same locality and collector. *Purchased*, 1912.

12. 10. 28. 74. Skull. Same locality and collector.

*Same history.*

14. 2. 20. 1. Body-skin. Little Otomi Bush, Ikon district, Southern Nigeria, north of Cameruns frontier.

*Presented by N. W. Thomas, Esq.*, 1914.

### C.—Dorcatherium aquaticum cottoni.

Dorcatherium aquaticum cottoni, *Lydekker*, *Proc. Zool. Soc.* 1906, vol. i, p. 113, *Great and Small Game of Africa*, p. 387, 1908; *Alexander*, *From Niger to Nile*, vol. ii, p. 393, 1907.

Typical locality Ituri Valley.

General colour still more rufous than in last, with light markings on back and flanks less distinct, less numerous, and not extending on to shoulders; face without distinct dark chevron; flank-band yellowish and almost disappearing midway between fore and hind limbs, no lateral bands below it; tail with much white and apparently more bushy.

6. 6. 2. 3. Skull and skin. Ituri Valley. Type.

*Presented by Major P. H. G. Powell-Cotton*, 1906.

7. 4. 23. 2. Skin. Ituri Valley.

*Presented by R. S. Reid, Esq.*, 1907.

7. 7. 8. 229–230. Two skulls and skins. Bima, Welle Valley; collected by Capt. G. B. Gosling.

*Presented by Capt. Alexander Gosling*, 1907.

## Section C.—TYLOPODA.

In this section three pairs of upper incisors are present in the young, the outermost of which persists throughout life, the lower canines are differentiated from the spatulate, forwardly directed lower incisors, and the anterior pair of premolars, when present, separated from the other cheek-teeth, which are tall-crowned and selenodont; only the two main toes (3rd and 4th) are developed in each foot, the terminal segments of which carry nails instead of hoofs, and have a broad fleshy pad inferiorly on which the animal walks; the metacarpals and metatarsals are severally fused into cannon-bones for the greater part of their length, but their lower extremities (vol. i, p. 2, fig. 1, c) are divergent and

lack the pulley-like ridges and grooves on their articular surfaces found in the two preceding sections; in the tarsus the navicular and cuboid remain distinct. The skull is devoid of either horns or antlers. The stomach has no distinct third compartment (maniplies), and the interior of the first (paunch or rumen) lacks the villi of the Pecora, while both the first and second chamber are furnished with large cells in which water can be stored; the placenta is diffuse, and the female has either four or two teats. With regard to the structure of the feet in this group, Pocock remarks that, with the exception of *Orcotragus*, all ruminating artiodactyles "walk upon the cutaneous pad forming the sole and heel of the hoof, and upon more or less of the inferior edge and apex of the nail in front. The camels [and llamas] form no exception to this rule, the only difference being that the small nail does not invade the area of the sole to anything like the same extent, and that the sole and the heel are continued further backwards."

At the present day the group has a remarkably discontinuous distribution, the camels being restricted to the Old World, and the llamas to South America; in the Tertiary period it was, however, abundantly represented in North America, as it also was in Eastern Europe.

## Family CAMELIDÆ.

As this is the only existing family of the section, its characters may be regarded as the same as those of the latter.

The two existing genera are distinguishable as follows:—

A. Size very large, back with one or two fleshy humps, ears small ..... *Camelus*.

B. Size much smaller, back without hump, ears larger..... *Lama*.

### I. Genus CAMELUS.

Camelus, *Linn.*, *Syst. Nat.* ed. 10, vol. i, p. 65, 1758, ed. 12, vol. i, p. 90, 1776; *H. Smith*, *Griffith's Animal Kingdom*, vol. v, p. 297, 1827; *Gray*, *Cat. Ruminants Brit. Mus.* p. 100, 1872; *Lydekker*, *Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 139, 1885; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 558, 1891; *Pocock*, *Proc. Zool. Soc.* 1910, p. 972.

Typical locality probably Arabia.

Size very large, back with one or two large fleshy humps in median line; dentition of adult: $i.\frac{1}{3}$, $c.\frac{1}{1}$, $p.\frac{3}{2}$, $m.\frac{3}{3} = 34$; anterior premolar placed nearly midway between second tooth of that series and canine; lower incisors somewhat proclivous, with outer pair the largest; skull elongated, with overhanging occiput, orbits encircled by bone, and premaxillæ not articulating with arched and rather long nasals; ears relatively short and rounded; feet broad, with toes imperfectly separated; tail of medium length, tufted; hair nearly straight, not woolly; teats four. No face-glands, but a pair of occipital glands.

Restricted at the present day to Asia and Africa, but known in a wild state only in the neighbourhood of the Gobi Desert of Central Asia.

The genus is typified by the single-humped *Camelus dromedarius*, but as this species is unknown in the wild state, it does not come within the purview of this Catalogue.

## CAMELUS BACTRIANUS.

Camelus bactrianus, *Linn., Syst. Nat.* ed. 10, vol. i, p. 65, 1758, ed. 12, vol. i, p. 90, 1766; *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 297, 1827; *Hutton, Journ. Asiat. Soc. Bengal*, vol. xv, p. 162, 1846; *Gray, Cat. Ungulata Brit. Mus.* p. 253, 1852, *Cat. Ruminants Brit. Mus.* p. 100, 1872, *Hand-List Ruminants Brit. Mus.* p. 170, 1873; *Radde, Reisen Ost-Siberien*, p. 238, 1861; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 271, 1862; *Severtzow, Ann. Mag. Nat. Hist.* ser. 4, vol. xviii, p. 170, 1876; *Finsch, Proc. Zool. Soc.* 1876, p. 696; *Przewalski, Petersb. Mitt. Erzb.* vol. xii, p. 17, 1876; *Blanford, Eastern Persia*, vol. ii, p. 97, 1876, *Fauna Brit. India, Mamm.* p. 558, 1891; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 330, 1884; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 191, 1891; *Flower and Lydekker, Study of Mammals*, p. 296, 1891; *Littledale, Proc. Zool. Soc.* 1894, p. 446; *Lesbre, Arch. Mus. Lyon*, vol. viii, p. 1, 1903; *Pocock, Proc. Zool. Soc.* 1910, p. 973.

Typical locality Eastern Europe or Western Asia.

Larger and more clumsily built than the typical species, with two dorsal humps, a thicker coat, shorter limbs, and feet more callous and better adapted for hard and rocky ground.

Camels occur wild in the neighbourhood of the Tarim Valley and other parts of Chinese Turkestan, but it is

probable that these are the descendants of domesticated herds. The same may be the case with some of the wild camels in the vicinity of Lob Nor and on the fringes of the Gobi, although it seems quite likely that others—like the horses of the same area—may be truly wild.

94. 2. 8. 1. Skin, mounted, of a wild or feral individual. East of Lob Nor, Chinese Turkestan.

*Presented by St. George Littledale, Esq.*, 1894.

## II. Genus LAMA.

Lama, *Cuvier, Leçons Anat. Comp., Tableau gén.* 1800; *Desmarest, Nouv. Dict. Hist. Nat.* vol. xxiv, *Table*, p. 31, 1804; *G. Fischer, Zoognosia*, vol. iii, p. 351, 1814; *Thomas, Proc. Zool. Soc.* 1891, p. 386.

Lacma, *Tiedemann, Zoologie*, vol. i, p. 428, 1804.

Auchenia, *Illiger, Prodr. Syst. Mamm.* p. 103, 1811; *Cuvier, Règne Animal*, vol. i, p. 25, 1817; *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 298, 1827; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 338, 1884; nec *Thunberg*, 1789.

Dromedarius, *Wagler, Nat. Syst. Amphib.* p. 31, 1830.

Auchenias, *Wagner, Wiegmann's Archiv Naturgesch.* vol. i, p. 349, 1843.

Llama, *Gray, Cat. Ungulata Brit. Mus.* p. 254, 1852, *Cat. Ruminants Brit. Mus.* p. 101, 1872.

Neoauchenia, *Ameghino, Rev. Argent. Hist. Nat.* vol. i, p. 242, 1891.

Size much smaller than in *Camelus*, and back without hump; adult dentition normally: $i.\frac{1}{3}$, $c.\frac{1}{1}$, $p.\frac{2}{2}$, $m.\frac{3}{3} = 32$, but anterior premolars sometimes wanting; upper premolars small; lower incisors long and procumbent, with the outer pair smallest; skull with less prominent ridges and relatively larger brain-chamber than in typical genus, and premaxillæ articulating with relatively short and broad nasals; ears rather long and pointed; feet narrower, with the toes, each of which has a distinct plantar pad, more separated than in *Camelus*; tail short; coat long and woolly; teats two.

Restricted at present day to western and southern South America.

The two species (as represented by wild forms) are distinguishable as follows:—

A. Size larger, callosities on limbs..... *L. glama.*

B. Size smaller, no callosities on limbs..... *L. vicugna.*

## I. LAMA GLAMA.

Camelus glama, *Linn. Syst. Nat.* ed. 10, vol. i, p. 65, 1758, ed. 12, vol. i, p. 91, 1766.

Lama glama, *Cuvier, Leçons Anat. Comp., Tableau gén.* 1800; *Thomas, Proc. Zool. Soc.* 1891, p. 387.

Lacma peruana, *Tiedemann, Zoologie*, vol. i, p. 428, 1804.

Auchenia lama, *Illiger, Prodr. Syst. Mamm.* p. 103, 1811.

Auchenia glama, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 299, 1827.

Camelus lama, *Blainville, Ostéographie, Camelus*, pl. ii.

Llama glama, *Gray, Cat. Ungulata Brit. Mus.* p. 260, 1852, *Cat. Ruminants Brit. Mus.* p. 101, 1872, *Hand-List Ruminants Brit. Mus.* p. 172, 1873.

Neoauchenia glama, *Ameghino, Rev. Argent. Hist. Nat.* vol. i, p. 242, 1891.

Llama (domesticated), Guanaco or Huanaco (wild).

Typical locality Peruvian Andes.

The type species; first known in Europe by the domesticated llama (*L. glama glama*), and likewise including the long-woolled alpaca (*L. g. pacos*).

As represented by the wild guanaco, the species is distinguished by its relatively large size (typically about 3 feet 7 inches at shoulder), stout build, long head, darkish fawn-brown colour, blackish face, and the presence of bare callosities on the limbs.

The two wild races are distinguished as follows:—

A. Size larger; basicranial length $11\frac{1}{2}$ to $11\frac{5}{8}$ inches. *L. g. huanacus.*

B. Size smaller; basicranial length $9\frac{3}{8}$ inches..... *L. g. cacsilensis.*

### A.—Lama glama huanacus.

Camelus huanacus, *Molina, Saggio Storia Nat. Chile*, vol. i, p. 317, 1782; *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 170, 1788; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 55, 1827.

Auchenia huanacus, *Illiger, Abh. Ak. Sci. Berlin*, 1811, pp. 108 and 111, 1815.*

Auchenia huanaca, *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 299, 1827.

Auchenia guanaco, *Meyer, Nova Acta Ac. Cæs. Leop.-Car.* vol. xvi, p. 552, 1833; *Schreber, Säugthiere*, vol. v, pp. 1803 and 1806, 1839.

Auchenia llama, *Waterhouse, Zool. Beagle, Mamm.* p. 26, 1839,

* Separate copies are stated to have been issued in 1811.

Auchenia lama, *Brandt, Mém. Ac. Sci. St. Pétersb.* vol. iv, p. 1, 1845; *Burmeister, Descript. Phys. Rép. Argent.* vol. iii, p. 457, 1879.

Lama guanaco, *Gay, Hist. Chile, Zool.* vol. i, p. 153, 1847.

Llama guanacus, *Gray, Cat. Ungulata Brit. Mus.* p. 257, 1852, *Cat. Ruminants Brit. Mus.* p. 101, 1872, *Hand-List Ruminants Brit. Mus.* p. 171, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 272, 1862.

Llama pacos (fera), *Gray, Cat. Ungulata Brit. Mus.* p. 260, 1852.

Auchenia huanacus, *Flower and Lydekker, Study of Mammals*, p. 300, 1891.

Lama huanachus, *Thomas, Proc. Zool. Soc.* 1891, p. 387; *Lahille, Ensayo Mam. Répub. Argent.* p. 31, 1900; *Prichard, Proc. Zool. Soc.* 1902, vol. ii, p. 275, *Through the Heart of Patagonia*, p. 253, 1902; *Scharff, Origin of Life in America*, p. 406, 1911; *Lönnberg, Arkiv Zool.* vol. viii, no. 19, p. 1, 1913.

Lama huanacos, *Selater, Proc. Zool. Soc.* 1891, p. 669.

Lama huanacus, *Matschie, Säugeth.* in *Ergebnisse Hamburg. Magalhaen. Sammelreise*, vol. iii, p. 19, 1898; *Berg, Comun. Mus. Buenos Aires*, vol. i, p. 260, 1900; *Lydekker, Great and Small Game of Europe, etc.* p. 375, 1901.

Lama huanacha, *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 36, 1907.

Guanaco or Huanaco; Wild Llama.

Typical locality probably the Chilian Andes, whence the range extends southwards to Patagonia and Tierra del Fuego.

Size relatively large; shoulder-height about 3 feet 7 inches; basal length of skull 11½ to 11⅝ inches (291–295 mm.).

37. 3. 15. 46 (78, *b*). Skin, mounted. Southern Tierra-del-Fuego; collected during the voyage of H.M.S. "Beagle."
*Presented by Admiral Sir R. Fitzroy, K.C.B.*, 1837.

674, *a*. Skeleton, immature. Chile.
*Purchased* (*Zoological Society*).

674, *f*. Skull. From an old skin collected in Patagonia or Tierra-del-Fuego during the voyage of H.M.S. "Beagle."
*Presented by C. R. Darwin, Esq.*

44. 10. 7. 34 (674, *b*). Skull. Chile; collected by Mr. T. Bridges. Figured in Gray's *Catalogue of Ungulata*, pl. xxiv, 1852. *Purchased*, 1844.

46. 1. 22. 4. Skin, young, mounted. Locality unknown.
*Purchased* (*Warwick*), 1846.

54. 5. 11. 2. Skin, young, mounted. Locality unknown.
*Purchased* (*Baker*), 1854.

55. 7. 3. 1. Skin, young. Locality unknown.
*Purchased (Zoological Society)*, 1855.

90. 2. 20. 15. Skull. Fox Point, Falkland Islands; collected during the voyage of H.M.S. "Challenger."
*Presented by the Government*, 1890.

99. 2. 22. 12. Skin, female. Province of Buenos Aires.
*Presented by the La Plata Museum*, 1899.

2. 1. 1. 111. Head-skin, female. Choquecamati, Bolivia; collected by Mr. P. O. Simons.
*Presented by O. Thomas, Esq.*, 1902.

2. 10. 16. 1. Skin, mounted. Patagonia.
*Presented by the Zoological Society*, 1902.

### B.—Lama glama cacsilensis.

Lama huanachus cacsilensis, *Lönnberg, Arkiv Zool.* vol. viii, no. 19, p. 8, 1913.

Typical locality Cacsile, Nuñoa, Peru.

Type in Royal Swedish Museum of Natural History.

Considerably smaller than preceding race, the basicranial length being $9\frac{5}{8}$ inches (244 mm.) in the type specimen.

No example in collection.

## II. LAMA VICUGNA.

Camelus vicugna, *Molina, Saggio Storia Nat. Chile*, p. 313, 1782; *H. Smith, Griffith's Animal Kingdom*, vol. iv, p. 58, 1827.

Auchenia vicugna, *Illiger, Abh. Ak. Sci. Berlin*, 1811, p. 108, 1815; *H. Smith, Griffith's Animal Kingdom*, vol. v, p. 300, 1827; *Flower and Garson, Cat. Ostcol. Mus. R. Coll. Surg.* pt. ii, p. 334, 1884; *Flower and Lydekker, Study of Mammals*, p. 300, 1901.

Llama vicugna, *Gray, Cat. Ungulata Brit. Mus.* p. 256, 1852, *Cat. Ruminants Brit. Mus.* p. 101, 1872, *Hand-List Ruminants Brit. Mus.* p. 170, 1873; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 272, 1862.

Lama vicugna, *Thomas, Proc. Zool. Soc.* 1891, p. 387; *Lydekker, Great and Small Game of Europe, etc.* p. 378, 1901; *Elliot, Cat. Mamm. Field Mus. (Field Mus. Zool. Pub.* vol. viii) p. 37, 1907; *Lönnberg, Arkiv Zool.* vol. viii, no. 19, p. 3, 1913.

Vicugna.

Typical locality probably Peru, whence the range extends to southern Ecuador and central Bolivia.

Size about one-fourth less than that of *L. g. huanacus*

(shoulder-height about 2 feet 9 inches; basicranial length about $8\frac{11}{16}$ inches = 220 mm.); build more slender; head shorter; colour lighter, without black on face; no bare callosities on limbs.

46. 7. 28. 20 (675, *b*). Skin, mounted, and skin, female. Bolivia; collected by Mr. T. Bridges. *Purchased*, 1846.

46. 10. 16. 16. Skull. Same locality and collector. *Same history.*

61. 1. 18. 3. Skeleton, immature. Locality unknown. *Purchased (Zoological Society)*, 1861.

96. 10. 7. 29. Skin, mounted. Catamarca, Argentina. *Presented by the La Plata Museum*, 1896.

97. 10. 3. 18. Skin. Junin, Peru; collected by Mr. J. Kalinowski. *Purchased*, 1897.

2. 1. 1. 112–113. Two skins, female. Choquecamate, Bolivia; collected by Mr. P. O. Simons. *Presented by O. Thomas, Esq.*, 1902.

## Section D.—SUINA.

Large or medium-sized Artiodactyla, with neobunodont * molars, absence of complete fusion of third and fourth metacarpals and metatarsals to form cannon-bones, and the skin either covered with sparse bristly hairs, or more or less nearly naked; no cranial appendages.

The distribution includes the greater part of the world, exclusive of Australia and New Zealand; but to what extent the Suina now inhabiting south-eastern Asia have been introduced by human agency is uncertain.

The existing members of the section are divisible into the two following families †:—

A. Head with an elongated mobile snout, terminating in an expanded, truncated, nearly naked, flat, oval disc in which the nostrils are pierced..... *Suidæ*.

B. Head with a broad and rounded bristly muzzle... *Hippopotamidæ*.

* Stehlin, *Abh. schweiz. pal. Ges.* vol. xxvi. p. 124, 1899; a term denoting a type of tubercular (bunodont) dentition with traces of a selenodont structure; whether this is a distinct modification or a derivative from decadent selenodontism is still uncertain.

† The writer follows Trouessart and Max Weber in regarding the peccaris as a subfamily of *Suidæ* instead of a separate family.

## Family I.—SUIDÆ.

Head terminating in an elongated mobile snout, the tip of which forms an expanded, truncated, nearly naked, flat, oval disc containing the nostrils, and supported by a prenasal bone; feet narrow, with four toes in front pair, the hoofs of the two middle ones in each pair with their adjacent surfaces flattened, and those of the lateral ones not applied to the ground in walking; teeth typically forty-four, but the number frequently reduced by suppression of one or more pairs; incisors rooted; molars elongated, with the outer and inner pair of tubercles connected by intermediate ones, and not forming distinct trefoils; no descending flange to mandible.

Distribution co-extensive with that of section.

The family is divisible into the two following subfamilies:—

A. Four toes to both fore- and hind-limbs; upper canines curving more or less upwards or outwards; stomach simple, except for a larger or smaller cardiac pouch; no dorsal gland; at least 4 teats..... *Suinæ.*

B. Hind-feet with only three functional toes; upper canines directed downwards; stomach complex; a dorsal gland; 2 teats..... *Dicotylinæ.*

### Subfamily i.—SUINÆ.

Four complete toes to each foot; teeth typically forty-four, but often reduced by the suppression of one or more pairs; upper canines curving more or less outwards or upwards; stomach simple, except for a more or less developed cardiac pouch; no dorsal gland; at least four teats; tail well developed; third and fourth metacarpals and metatarsals completely free.

The distribution is limited to the Old World, extending at the present day so far eastward as New Guinea, although there is very strong probability that the Papuan forms were introduced by human agency.

The subfamily is divisible into the following generic groups:—

A. Summits of upper canines of males completely abraded by attrition of lower pair.
   *a*. No osseous tuberosities on or above sheaths of upper canines; ears not distinctly tufted *Sus*.
   *b*. Two pairs of osseous tuberosities on and above sheaths of upper canines..... *Potamochœrus*.

B. A facet worn on lower surface of upper canines by attrition of lower pair, leaving the summits more or less nearly entire.
   *a*. Last molar in each jaw brachyodont and normal ..... *Hylochœrus*.
   *b*. Last molar in each jaw hypsodont and abnormally complex..... *Phacochœrus*.

C. No abrasion of upper canines (which are very long and slender) by lower pair ..... *Babirussa*.

## I. Genus SUS.

Sus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 49, 1758, ed. 12, vol. 1, p. 102, 1766; *Blasius, Säugeth. Deutschlands*, p. 508, 1857; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 326, 1869; *Stehlin, Abh. schweiz. pal. Ges.* vol. xxvi, passim, 1899; *Flower and Lydekker, Study of Mammals*, p. 281, 1891; *Miller, Cat. Mamm. West. Europe*, p. 956, 1912.

Aper, *Pallas, Misc. Zool.* p. 16, 1766; *Rafinesque, Analyse de Nature*, p. 56, 1815.

Centuriosus, *Gray, Proc. Zool. Soc.* 1862, p. 17, 1868, p. 40, *Cat. Carnivora, etc. Brit. Mus.* p. 347, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 66, 1873.

Scrofa, *Gray, Proc. Zool. Soc.* 1868, p. 38, *Cat. Carnivora, etc. Brit. Mus.* p. 345, 1869.

Euhys, *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 339, 1869, *Ann. Mag. Nat. Hist.* ser. 4, vol. x, p. 435, 1873, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 57, 1873.

Aulacochœrus, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. xi, p. 435, 1873, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 58, 1873.

Dasychœrus, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. xi, p. 435, 1873, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 58, 1873.

Dentition: $i.\ \frac{3}{3}$, $c.\ \frac{1}{1}$, $p.\ \frac{4}{4}$, $m.\ \frac{3}{3} = 44$; outer upper incisors and first upper and lower premolars not infrequently wanting in adults; summits of upper canines completely abraded by wearing against the lower pair; molars brachyodont and of the normal neobunodont type; skull long, high, and narrow, without osseous tuberosities above or on sheaths of upper canines; ears not distinctly tufted. Young usually striped longitudinally.

The distribution is co-extensive with that of the sub-

family, except that, with the exception of the occurrence of one species in the Eastern Sudan, it does not include Ethiopian Africa.

The genus is divisible into the two following subgeneric groups:—

A. Size large or medium; tail usually of moderate length; 6 pairs of teats ..... *Sus.*
B. Size small; tail very short; 3 pairs of teats ..... *Porcula.*

### 1. Subgenus SUS.

Size large or medium; tail usually of moderate length; six pairs of teats.* Distribution co-extensive with that of genus.

The species here recognised† are distinguishable as follows:—

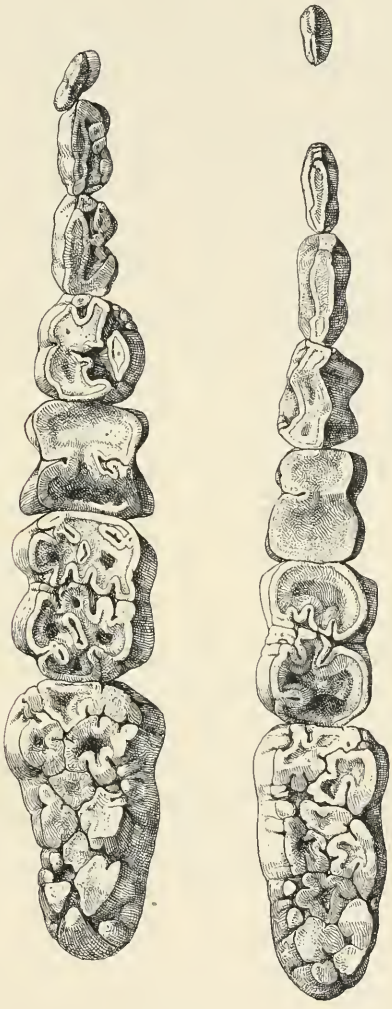
A. Young striped; no warts on face.
  *a*. Lower canine with hind surface wider than outer one.
    *a'*. Face typically not banded; last molars complex.
      *a''*. Nuchal crest moderate..... *S. scrofa.*
      *b''*. Nuchal crest taller ..... *S. cristatus.*
    *b'*. Face typically banded; last molars simpler.
      *c'*. A brownish streak on muzzle ..... *S. vittatus.*
      *d'*. A whitish streak on muzzle..... *S. leucomystax.*
  *b*. Lower canine with hind surface narrower than outer one.
    *b'*. Size medium; head moderate; tail-tuft small *S. celebensis.*
    *c'*. Size large; head very long; tail-tuft large ... *S. barbatus.*
B. Young uniformly coloured; face with warts..... *S. verrucosus.*

### 1. SUS SCROFA.

Sus scrofa, *Linn. Syst. Nat.* ed. 10, vol. i, p. 49, 1758, ed. 12, vol. i, p. 103, 1776; *Desmarest, Mammalogie*, vol. ii, p. 389, 1822; *Griffith, Animal Kingdom*, vol. v, p. 287, 1827; *Jenyns, Brit. Vert. Anim.* p. 39, 1835; *Bell, British Quadrupeds*, p. 358, 1837; *Owen, Brit. Foss. Mamm. and Birds*, p. 426, 1846; *Gray, Proc. Zool. Soc.* 1856, p. 158, 1860, pp. 183 and 448, 1868, p. 30, *Cat. Carnivora etc. Brit. Mus.* p. 337, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 60, 1873; *Blasius, Säugeth.*

* So far as recorded.
† The views of Major are in the main followed on this subject.

*Deutschlands*, vol. i, 517, 1857; *Severtzow*, *Ann. Mag. Nat. Hist.* ser. 4, vol. xviii, p. 387, 1876; *Blanford*, *Eastern Persia*, vol. ii,



A B

Fig. 47.—Right Upper (A) and Lower (B) Cheek-Teeth of Wild Boar (*Sus scrofa*). nat. size.

From Miller, *Cat. Mamm. Western Europe.*

p. 86, 1876; *Danford and Alston*, *Proc. Zool. Soc.* 1877, p. 275; *Harting*, *Extinct Brit. Anim.* p. 76, 1880; *Thomas*, *Trans. Linn. Soc.* ser. 2, vol. v, p. 195, 1889, *Proc. Zool. Soc.* 1911, p. 140,

1912, p. 392; *Tristram, Fauna Palestine*, p. 3, 1884; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 348, 1884; *Lataste, Actes Soc. Linn. Bordeaux*, vol. xxxix, p. 163, 1885; *Lydekker, Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 260, 1885, *Horns and Hoofs*, p. 353, 1893, *Brit. Mamm.* p. 255, 1895, *Great and Small Game of Europe, etc.* p. 278, 1901, *Great and Small Game of Africa*, p. 388, 1908; *Radde, Zool. Jahrb.* vol. iv, p. 1068, 1889; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 195, 1891; *Flower and Lydekker, Study of Mammals*, p. 283, 1891; *Stehlin, Abh. schweiz. pal. Ges.* vol. xxvi, 1899, vol. xxvii, 1900, passim; *Anderson and de Winton, Mamm. Egypt*, p. 354, 1902; *Millais, Mamm. Gt. Britain*, vol. iii, p. 63, 1906; *Scharff, European Animals*, p. 44, 1907; *Elliot, Cat. Mamm. Field Mus. (Field Mus. Zool. Pub.* vol. viii) p. 31, 1907; *Ward, Records of Big Game*, ed. 6, p. 453, 1910, ed. 7, p. 452, 1914; *Tronessart, Faune Mamm. Europe*, p. 225, 1910; *Miller, Cat. Mamm. West. Europe*, p. 957, 1912.

Sus setosus, *Boddaert, Elenchus Anim.* vol. i, p. 157, 1785.

Sus setosus, *var. a.* aper, *Boddaert, loc. cit.* 1785.

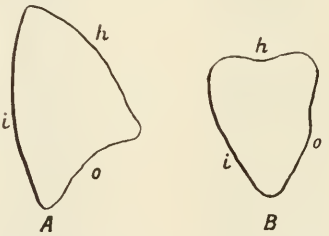



Fig. 48.—Transverse Sections of Lower Canines of *Sus scrofa* (A) and *Sus verrucosus* (B). *i*, inner, *h*, hind, *o*, outer surface.

From Stehlin.

Sus europæus, *Pallas, Zoogr. Rosso-Asiat.* vol. i, p. 265, 1811.

Sus scropha, *Jardine, Naturalist's Libr., Mamm.* vol. v, p. 205, 1836.

Sus fasciatus, *Gray, List Mamm. Brit. Mus.* p. 184, 1843.

Sus scrofa fasciatus, *Wagner, Schreber's Säugthiere, Suppl.* vol. iv, p. 322, 1844.

Sus scrofa, *var.* celtica, *Strobel, Atti. Soc. Ital. Sci. Nat.* vol. xxv, p. 79, 1882.

Wild Boar or Wild Swine.

Typical locality Germany.

Size moderately or very large; face without warts; muzzle relatively short; lower canine (fig. 48) with outer surface markedly less in width than hind one, which is oblique and next in width to the inner surface—the widest of the three; last upper molar typically large, with a distinct third ridge (fig. 47); general colour brown, with an

individual tendency to blackish, greyish, or rufous; face, cheeks, and throat with a grizzling of whitish hairs, which does not, however, form definite markings; bristles of nape long, but not forming a conspicuous crest; under-fur (occasionally wanting) thick and woolly; young brown with blackish stripes.

The range formerly included the whole of the afforested districts of temperate Europe, from Ireland and Scandinavia

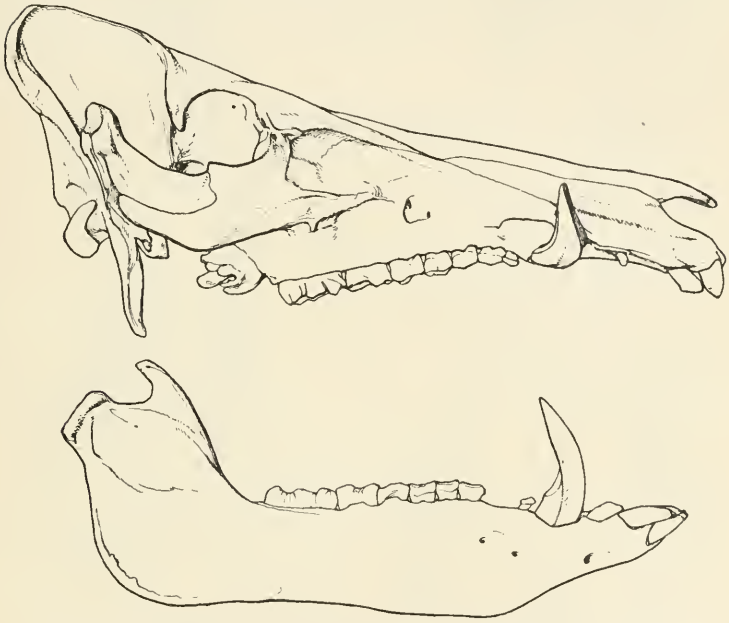


Fig. 49.—Side View of Skull, with the Lower Jaw detached, of Wild Boar (*Sus scrofa*). $\frac{1}{4}$ nat. size.
From Miller, *Cat. Mamm. Western Europe.*

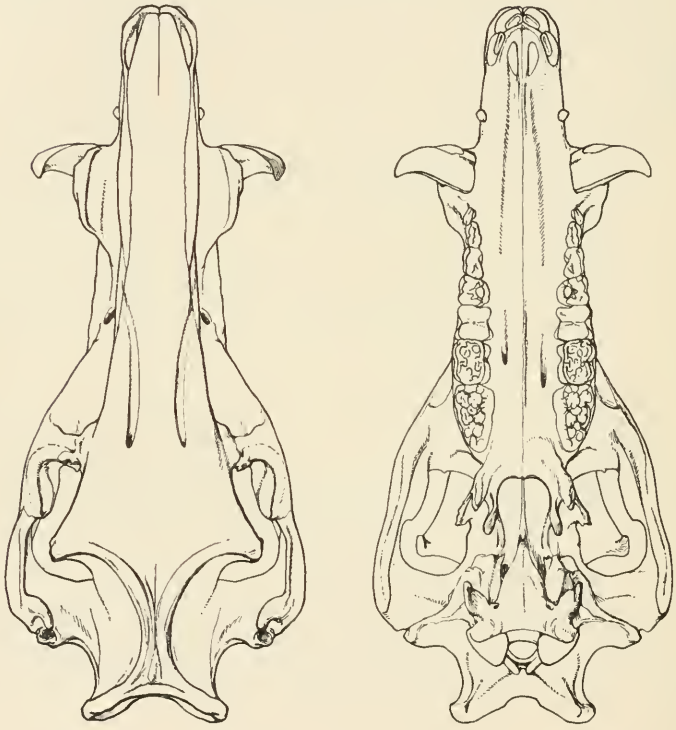
eastwards, but is now limited to the countries south of the Baltic; eastwards it appears to include all temperate Asia north of the line of the Himalaya.

The better-known races are distinguishable as follows:—

A. Colour dark, without marked contrast between body and limbs.
  *a*. Size very large; upper skull-length $17\frac{3}{4}$ inches ..... *S. s. attila.*
  *b*. Size smaller; skull-length 15 to $16\frac{1}{4}$ inches *S. s. scrofa.*

*c*. Size smaller; * skull-length 14½ inches... *S. s. lybicus.*
*d*. Size smaller; skull-length 13¾ inches..... *S. s. castilianus.*
*e*. Size smaller; skull-length 11⅞ inches; face banded..... *S. s. meridionalis.*
*f*. Size slightly smaller; skull-length 11¾ inches; face not banded; no under-fur *S. s. bœticus.*

B. Colour lighter, with a distinct contrast between body and limbs (which are black)..... *S. s. nigripes.*



A B

FIG. 50.—FRONTAL (A) AND PALATAL (B) ASPECTS OF SKULL OF WILD BOAR (*Sus scrofa*). ¼ nat. size.
From Miller, *Cat. Mamm. Western Europe.*

*S. s. barbarus*, *S. s. moupinensis*, and *S. s. sennaarensis* (the last two of which are only provisionally included under the present specific heading) are too imperfectly known to be definitely classified.

* One specimen only.

## A.—Sus scrofa scrofa.

Sus scrofa ferus, *Gmelin*, *Linn.'s Syst. Nat.* vol. i, p. 207, 1788; *Gray*, *Proc. Zool. Soc.* 1862, p. 13; *Nehring*, *Sitzber. Ges. nat. Freunde*, 1890, p. 9.

Sus scrofa scrofa, *Thomas*, *Proc. Zool. Soc.* 1912, p. 392.

Typical locality Germany.

Size relatively large, upper skull-length ranging from about 15 to 16¼ inches (380–410 mm.); woolly under-fur developed; third ridge of last upper molar distinct (fig. 47).

58, *a*. Skin, young. Europe (?). Type of *S. fasciatus*. *No history.*

713, *m*. Skeleton. Germany. *Transferred from Zoological Society's Museum.*

43. 12. 29. 12. Skin, young. France. *Purchased* (*Lefèbre*), 1843.

58. 5. 4. 38 (713, *i*). Skull, immature female. Europe.* *Purchased* (*Zoological Society*), 1858.

58. 5. 4. 42 (713, *k*). Skull, young. Europe. *Same history.*

59. 9. 6. 100 (713, *j*). Skull. Würtemberg; collected by Dr. A. Günther. *Purchased*, 1859.

62. 3. 20. 6. Skull. Germany. *Purchased*, 1862.

92. 8. 3. 1. Skin. Waldleiningen, Baden. *Presented by H.R.H. the Grand Duke Louis of Hesse*, 1892.

13. 2. 22. 1. Skull and skin, young. Valescure, Var, France. *Presented by W. E. de Winton, Esq.*, 1913.

## B.—Sus scrofa meridionalis.

Sus scrofa meridionalis, *Major*, *Atti Soc. Tosc. Sci. Nat.* vol. iii, *P.V.* p. 119, 1881, vol. vi, p. 346, 1883, *Zool. Anz.* vol. vi, p. 295, 1883; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 68, 1899.

Sus scrofa *var.* sardous, *Strobel*, *Atti Soc. Ital. Sci. Nat.* vol. xxv, p. 221, 1882; *Trouessart*, *Faune Mamm. Europe*, p. 226, 1910; *Dehaut*, *Hist. Zool. Pal. Corse et Sardaigne*, fasc. 4, p. 64, pls. i, ii, 1912.

Sus meridionalis, *Miller*, *Cat. Mamm. West. Europe*, p. 960, 1912.

Typical locality Sardinia; the range may include Corsica (*vide* Dehaut, *op. cit.*).

* Specimens of which the locality is uncertain may belong to other races.

Smaller than typical race, the upper skull-length about $11\frac{7}{8}$ inches (300 mm.); talon of third upper molar obsolete; colour generally similar, but a light band on each side of the face, which unites with its fellow on under surface of the muzzle to form a chevron. Major and Dehaut regard this race as nearly related to the Malay *S. vittatus*, between which and *S. scrofa* it is stated by the former writer to be almost exactly intermediate; probably no under-fur.

No specimen in collection.

### C.—Sus scrofa castilianus.

Sus scrofa castilianus, *Thomas*, *Proc. Zool. Soc.* 1912, pp. 391 and 392 (*Abs. P.Z.S.* 1912, p. 13); *Miller*, *Cat. Mamm. West. Europe*, p. 960, 1912; *Cabrera*, *Cat. Met. Mamm. Mus. Madrid*, p. 133, 1912.

Typical locality Burgos, Northern Spain.

Intermediate in point of size between typical race and the undermentioned *S. s. bæticus:* length of upper surface of skull about $13\frac{3}{4}$ inches (353 mm.); under-fur present.

11. 10. 5. 3. Skull and skin. Quintanar de la Sierra, near Burgos; collected by Rev. S. Gonzales. Type.

*Presented by the Hon. N. C. Rothschild*, 1911.

8. 7. 7. 32, 33. Two skulls and skins, female. Same locality; collected by Srs. S. and N. Gonzales.

*Purchased*, 1908.

### D.—Sus scrofa bœticus.

Sus scrofa bœticus, *Thomas*, *Proc. Zool. Soc.* 1912, pp. 391 and 393 (*Abs. P.Z.S.* 1912, p. 14); *Miller*, *Cat. Mamm. West. Europe*, p. 960, 1912.

Typical locality Coto Doñana, Huelva, Southern Spain.

Smaller than preceding race—length of upper surface of skull about $11\frac{3}{4}$ inches (324 mm.), without under-fur.

95. 9. 4. 16. Skull and skin, female. Almonte, Seville.

*Presented by the Lord Lilford*, 1895.

8. 3. 8. 12. Skull and skin. Coto Doñana. Type.

*Presented by Abel Chapman, Esq.*, 1908.

8. 3. 8. 13. Skull. Same locality. *Same history.*

## E.—Sus scrofa barbarus.

Sus scrofa, *var.* barbarus, *Sclater, Proc. Zool. Soc.* 1860, p. 43.

Sus scrofa barbarus, *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 338, 1869; *Lydekker, Game Animals of Africa*, p. 389, 1908.

Typical locality Morocco.

Imperfectly known, but stated to have a shorter and less abundant coat than French wild boars, from which it also frequently differs by its rather darker colour. From 33 to 35 inches is the probable shoulder-height, although a still taller stature has been suggested.

* * * *. Skin, immature, mounted. Morocco; collected by E. W. A. Drummond, Esq. *Purchased (Zoological Society).*

62. 12. 26. 1 (713, *v*). Skin and skeleton. Barbary. Type (?). *Purchased (Zoological Society)*, 1862.

64. 12. 4. 1. Skeleton. Barbary.
*Presented by H. Christy, Esq.*, 1864.

12. 10. 17. 1. Skull and skin, immature. Morocco; collected by Major H. F. Brooke.
*Presented by the Zoological Society*, 1912.

## F.—Sus scrofa sennaarensis.

Sus sennaarensis, *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. xix, p. 365, 1864; *Gray, Proc. Zool. Soc.* 1868, p. 32, *Cat. Carnivora, etc. Brit. Mus.* p. 338, 1869; *Hartmann, Zeits. Erdkunde*, vol. iii, p. 349, 1868.

Sus vittatus sennaariensis. *Major, Zool. Anz.* vol. vi, p. 296, 1883.

Sus scrofa, *Anderson and de Winton, Mamm. Egypt*, p. 354, pl. lxiii, 1902.

Sus scrofa sennarensis, *Lydekker, Game Animals of Africa*, p. 390, 1908.

Typical locality Sennar; the range also including Kordofan and neighbouring districts.

Imperfectly known, coat stated to be very dense and bristly, and dull olive-black variegated with yellow in colour. Reference to present species provisional.

No specimen in collection.

## G.—Sus scrofa lybicus.

Sus lybicus, *Gray, Proc. Zool. Soc.* 1868, p. 31, *Cat. Carnivora, etc. Brit. Mus.* p. 338, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 65, 1872.

Typical locality Xanthus, Asia Minor; the range may include Syria.

Described on the evidence of the undermentioned skull, which measures 14½ inches in length, and is stated to differ from all skulls of German wild boars.

44. 7. 13. 7 (713, *a*). Skull, female. Xanthus, Asia Minor. Type. *Presented by Sir Charles Fellows*, 1844.

14. 4. 17. 1. Skull and skin. Karajasi, Tiflis, Asia Minor. *Presented by the Tiflis Museum (through Col. Kaznakow)*, 1914.

14. 4. 17. 2. Skull and skin, female. Same locality. *Same history.*

## H.—Sus scrofa attila.

Sus attila, *Thomas, Proc. Zool. Soc.* 1912, pp. 391 and 393 (*Abs. P.Z.S.* 1912, p. 13); *Miller, Cat. Mamm. West. Europe*, p. 960, 1912.

Sus scrofa attila, *Lydekker, Ward's Records of Big Game*, ed. 7, p. 452, 1914.

Typical locality Kolozsvar (or Klausenburg), Transylvania; limits of range to eastward not yet ascertained.

Considerably larger than typical race, upper skull-length about 17¾ inches (452 mm.); woolly under-fur present; general colour apparently rather lighter than in typical race. This eastern representative of the wild boar bears almost exactly the same relation to the typical German animal as is presented by the maral or eastern red deer (*supra*, p. 126) to the red deer of Western Europe; and if the maral be regarded as a subspecies rather than a full species, the same view must be held in the case of the eastern wild boar.

3. 3. 12. 1. Skin, mounted. Volhynia, Russian Poland. *Presented by Count Josef Potocki*, 1903.

12. 1. 23. 1. Skull and skin. Kolozsvar, Transylvania; collected December, 1911. Type.

*Presented by Fräulein Sarolta von Wertheimstein*, 1912.

14. 3. 19. 1. Skull and skin. Soborin, Comitad Arad, Hungary. *Same donor*, 1914.

The following specimens are provisionally referred to this race :—

87. 12. 22. 2. Skull, female. Northern slope of Western Caucasus. *Presented by St. George Littledale, Esq.*, 1887.

91. 8. 10. 1. Head, mounted. N.W. Amurland. *Presented by the Hon. Walter Rothschild*, 1891.

92. 3. 16. 10. Skull. Northern side of Western Caucasus. *Presented by St. George Littledale, Esq.*, 1892.

## I.—Sus scrofa nigripes.

Sus scrofa, *var.* nigripes, *Blanford, Journ. Asiat. Soc. Bengal*, vol. xliv, pt. ii, p. 112, 1875, *Zool. Second Yarkand Mission, Mamm.* p. 79, 1879; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 195, 1891; *J. H. Miller, Field*, vol. cxx, p. 284 (fig.), 1912.

Sus scrofa nigripes, *Lydekker, Great and Small Game of Europe, etc.* p. 279, 1901.

Typical locality Tien Shan, in the Kashgar district.

Co-types in the Indian Museum, Calcutta.

Size large; general colour light dull brown, without admixture of black hairs; feet and much of the rest of the legs black; a pale hair-brown woolly under-fur present; ears darker than head and back, and a black ring round each eye; occipital plane forming a more obtuse angle with base of skull than in Hungarian race.

12. 7. 27. 1. Skull. Tien Shan; collected by J. H. Miller, Esq. *Purchased*, 1912.

## J.—Sus scrofa moupinensis.

Sus moupinensis, *Milne-Edwards, Arch. Mus. Paris*, vol. vii, *Bull.* p. 93, 1872, *Rech. Mamm.* p. 377, pls. lxxx and lxxxi, 1874; *Lydekker, Game Animals of India, etc.* p. 283, 1907; *Allen, Bull. Mus. Harvard Coll.* vol. liv, p. 205, 1912.

Sus vittatus moupinensis, *Major, Zool. Anz.* vol. vi, p. 296, 1883.

Sus cristatus moupinensis, *Lydekker, Great and Small Game of India, etc.* p. 266, 1900.

Typical locality Moupin, Sze-chuan, Western China.

Type in Paris Museum.

Said to be in a considerable degree intermediate between *S. scrofa* and *S. vittatus*.

96. 11. 4. 4. Skull and skin. Sze-chuan; collected by Berezowski. *By exchange with Tring Museum*, 1896.

## II. SUS CRISTATUS.

Sus scrofa, *Sykes*, *Proc. Zool. Soc.* 1831; *Elliot*, *Madras Journ.* vol. x, p. 219, 1839; *McCleland*, *Proc. Zool. Soc.* 1839, p. 150; *Adams*, *ibid.* 1858, p. 531; *Blyth*, *Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 139, 1863; *Blanford*, *Journ. Asiat. Bengal*, vol. xxxvi, p. 197, 1868; *Anderson*, *Journ. Linn. Soc.* vol. xxi, p. 341, 1889; nec *Linn.*

Sus cristatus, *Wagner*, *Münch. Gelchrt. Anz.* vol. ix, p. 535 (misprint for 435), 1839; *Gray*, *Proc. Zool. Soc.* 1868, p. 27, *Cat. Carnivora, etc. Brit. Mus.* p. 333, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 62, 1873; *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xliv, pl. ii, 1875, *Mamm. and Birds Burma*, p. 43, 1875; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 345, 1884; *Murray*, *Zool. of Sind*, p. 54, 1884; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 193, 1891; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 560, 1891; *Flower and Lydekker*, *Study of Mammals*, p. 283, 1891; *Lydekker*, *Horns and Hoofs*, p. 354, 1893, *Great and Small Game of India*, p. 258, 1900, *Game Animals of India*, p. 277, 1907; *Flower*, *Proc. Zool. Soc.* 1900, p. 375; *Wroughton*, *Journ. Bombay Nat. Hist. Soc.* vol. xxi, p. 1194, 1912; *Ward*, *Records of Big Game*, ed. 6, p. 454, 1910, ed. 7, p. 453, 1914.

Sus indicus, *Gray*, *List Mamm. Brit. Mus.* p. 185, 1843; *Hutton and Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xv, p. 135, 1846; *Cantor*, *ibid.* p. 261, 1846; *Kelaart*, *Prodr. Faunæ Zeylan.* p. 78, 1852; *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xxix, p. 105, 1857; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 277, 1862; *Jerdon*, *Mamm. India*, p. 241, 1867; *MacMaster*, *Notes on Jerdon*, p. 59, 1870; *Stolizcka*, *Journ. Asiat. Soc. Bengal*, vol. xli, pt. ii, p. 228, 1873; *Lydekker*, *ibid.* vol. xlvi, p. 287, 1876; *Sterndale*, *Mamm. India*, p. 416, 1884.

Sus aper, *vars.* alpomus et isonotus, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. x, p. 911, 1842.

Sus affinis, *Gray*, *Cat. Osteol. Brit. Mus.* p. 71, 1847.

Sus zeylonensis, *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xx, p. 173, 1852, vol. xxi, p. 351, 1853, vol. xxix, p. 105, 1860.

Sus bengalensis, *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xxix, p. 105, 1860.

Sus vittatus cristatus, *Major*, *Zool. Anz.* vol. vi. p. 296, 1883.

Typical locality probably the Malabar coast.

Size typically large, the shoulder-height ranging from 28 to 36 inches; distinguished from typical *S. scrofa* by the greater development of the nuchal crest, or mane, and the

larger size and greater complexity of the last, or third, molar in each jaw, as well as by the taller build and the scantier coat, under-fur being absent. The trans-Gangetic form was separated as *S. bengalensis* on account of the supposed less development of the parietal constriction of the skull.

The distributional area includes India—to a considerable height in the Himalaya—Ceylon, Burma, Tenasserim, Siam, part of the Malay Peninsula, and some of the adjacent islands. The Tenasserim representative of the species is small.

### A.—Sus cristatus cristatus.

Sus cristatus typicus, *Lydekker, Great and Small Game of India*, p. 261, 1900, *Game Animals of India, etc.* p. 279, 1907.

Typical locality probably the Malabar coast.

General character those of the species.

716, *b*. Skull. India.
*Bequeathed by Gen. T. Hardwicke, about* 1835.

716, *g*. Skull, young. Nepal.
*Presented by B. H. Hodgson, Esq.*

716, *o*. Skull, wanting tusks. India.
*Presented by Sir John Boileau.*

38. 3. 13. 48 (716, *r*). Skull. Nilgiri Hills, Travancore. Type of *S. affinis*. *Purchased* (*Turner*), 1838.

38. 3. 13. 49 (716, *k*). Skull. Malabar.
*Purchased* (*Turner*), 1838.

45. 1. 8. 86 (716, *f*). Skull. Nepal.
*Presented by B. H. Hodgson, Esq.*

45. 1. 8. 87 (716, *e*). Skull. Nepal. *Same history.*

45. 1. 8. 88 (716, *d*). Skull. Nepal. *Same history.*

45. 1. 8. 89 (716, *c*). Skull, immature. Nepal.
*Same history.*

45. 1. 8. 91 (716, *i*). Skull, with milk-teeth. Nepal.
*Same history.*

45. 1. 8. 92 (716, *j*). A similar specimen. Nepal.
*Same history.*

52. 11. 12. 1 (716, *p*). Skull. India. *Purchased*, 1852.

56. 5. 6. 57 (716, *l*). Skull. Nepal Tarai; collected by W. Theobald, Esq. *Presented by Dr. T. Oldham*, 1856.

56. 5. 6. 58 (716, *m*). Skull, immature female. Same locality and collector. *Same history.*

56. 5. 6. 59 (716, *n*). Skull, female. Same locality and collector. *Same history.*

58. 6. 24. 123 (716, *u*). Skull. Sikhim.
*Presented by B. H. Hodgson, Esq.*, 1858.

58. 6. 24. 124 (716, *s*). Skull. Same locality.
*Same history.*

58. 6. 24. 125 (716, *t*). Skull. Same locality.
*Same history.*

86. 2. 1. 6. Skull. Sind.
*By exchange with the Karachi Museum*, 1886.

1. 6. 20. 2. Skin, mounted, and skull. From a herd kept by H.M. Queen Victoria in Windsor Forest.
*Presented by H.M. King Edward VII.*, 1901.

1. 6. 20. 3. Skull and skin, female. From the Windsor herd. *Same history.*

3. 2. 6. 76. Skull and head-skin, immature. Jalor, Malay Peninsula. *Presented by Messrs. H. C. Robinson and N. Annandale*, 1903.

6. 5. 28. 1. Skin, mounted, and skull. Central Provinces.
*Purchased (Ward)*, 1906.

12. 11. 17. 1. Skin, mounted. Wardha district, Central Provinces. A very large old grey boar.
*Presented by F. C. Anderson, Esq.*, 1912.

## B.—Sus cristatus jubatus.

Sus jubatus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxx, p. 745, 1906.
Sus cristatus jubatus, *Lydekker*, *Game Animals of India, etc.* p. 283, 1907.

Typical locality Trong, Lower Siam.

Type in U.S. National Museum, Washington.

Smaller than typical race, with proportionately smaller and nearly bare ears.

No specimen in collection.

## C.—Sus cristatus jubatulus.

Sus jubatulus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxx, p. 746, 1906.
Sus cristatus jubatulus, *Lydekker*, *Game Animals of India, etc.* p. 283, 1907.

Typical locality Pulo Terutau, off the Malay Peninsula.

Type in U.S. National Museum, Washington.

Similar to preceding race, but smaller.

9. 11. 1. 152. Skull. Pulo Langkawi, off the Malay Peninsula; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

9. 11. 1. 153. Skull. Pulo Terutau; same collector. *Same history.*

9. 11. 1. 154. Skull, female. Same locality and collector. *Same history.*

9. 11. 1. 155. Skull, female. Same locality and collector. *Same history.*

9. 11. 1. 156. Skull, female. Same locality and collector. *Same history.*

9. 11. 1. 157. Skull, young female, imperfect. Same locality and collector. *Same history.*

9. 11. 1. 158. Skull, female. Same locality and collector. *Same history.*

## III. SUS LEUCOMYSTAX.

Sus leucomystax, *Temminck*, *Siebold's Fauna Japon., Mamm.* p. 6, pl. xx, 1842; *Swinhoe*, *Proc. Zool. Soc.* 1865, p. 466, 1870, p. 640; *Gray*, *ibid.* 1868, p. 26, *Cat. Carnivora, etc. Brit. Mus.* p. 333, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 61, 1873; *Nehring. Sitzber. Ges. nat. Freunde*, 1885, p. 142, *Zool. Garten*, vol. xxvi, p. 325, 1885; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 69, 1899; *Thomas*, *Proc. Zool. Soc.* 1905, vol. ii, p. 357; *Aoki*, *Annot. Zool. Japon.* vol. viii, p. 339, 1913.

Sus vittatus leucomystax, *Major*, *Zool. Anz.* vol. vi, p. 296, 1883.

Sus vittatus japonica, *Nehring*, *Zool. Garten*, vol. xxvi, p. 336, 1885.

Typical locality Japan, including the Islands of Hondo, Shikoku, and Kiushiu.

Apparently allied to *S. vittatus*, but provisionally allowed to rank as a separate species, as the fauna of Japan is in general markedly distinct from that of Malaya.

General colour blackish brown, with a streak from angles of mouth to lower jaw and under-parts white; ears densely haired; skull relatively wider than in *S. scrofa* with a higher lachrymal. The white muzzle-streak is stated by Nehring to occur occasionally in *S. scrofa*.

The range includes Formosa; the two races usually recognised being distinguished as follows:—

A. Size larger, ears larger..... *S. l. leucomystax.*
B. Size smaller, ears smaller..... *S. l. taivanus.*

## A.—Sus leucomystax leucomystax.

Typical (and only) locality Japan.

Size large, with relatively big ears.

67. 7. 8. 22. Skeleton, young, provisionally referred to this race. *Purchased* (*Zoological Society*), 1867.

70. 20. 10. 38 (1595, *a*, *b*). Skull and skin; collected at Shanghai by R. Swinhoe, Esq. *Purchased*, 1870.

80. 3. 20. 29. Skull. Japan; collected by H. Pryer, Esq. *Purchased* (*Janson*), 1880.

5. 5. 30. 28. Skull and skin, female. Washikaguchi, Hondo; collected by M. P. Anderson, Esq. *Presented by the Duke of Bedford, K.G.*, 1905.

## B.—Sus leucomystax taivanus.

Porcula taivana, *Swinhoe*, *Proc. Zool. Soc.* 1862, p. 360.

Sus taivanus, *Swinhoe*, *Proc. Zool. Soc.* 1864, p. 383, 1870, p. 641; *Gray*, *ibid.* 1867, p. 240, 1868, p. 26, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 61, 1873; *Aoki*, *Annot. Zool. Japon.* vol. viii, p. 340, 1913.

Sus vittatus taivanus, *Major*, *Zool. Anz.* vol. vi, p. 296, 1883.

Typical locality Formosa.

Smaller than typical race, with proportionately smaller ears.

The under-mentioned specimens represent the type of the race.

68. 10. 9. 1 (1594, *l*, *m*). Skull, without lower jaw, immature, and lower jaw of a second and older animal. S. W. Formosa. *Presented by R. T. Collingwood, Esq.*, 1868.

70. 2. 10. 39. Skin. Formosa; collected by R. Swinhoe, Esq. *Purchased*, 1870.

70. 2. 10. 40. Skin, immature. Same locality and collector. *Same history.*

70. 2. 10. 41 (1594, *l*). Skin, young. Same locality and collector. *Same history.*

70. 2. 10. 42 (1594, *e*). Skin, young. Same locality and collector. *Same history.*

70. 2. 10. 43 (1594, *f*). Skin. Same locality and collector. *Same history.*

70. 2. 10. 84 (1594, *j*). Skull, female. Same locality and collector. *Same history.*

70. 2. 10. 85 (1594, *h*). Skull. Same locality and collector. *Same history.*

70. 2. 10. 86 (1594, *k*). Skull, young female. Same locality and collector. *Same history.*

70. 2. 10. 87 (1594, *i*). Skull, female. Same locality and collector. *Same history.*

70. 2. 10. 88 (1594, *a*). Skull and skin, immature female. Same locality and collector. *Same history.*

96. 5. 2. 1–2. Two skins. Formosa; collected by P. A. Holst, Esq. *Purchased (Danfelt)*, 1896.

9. 4. 1. 507. Skull and skin. Pulo Bintang, Rhio Linga Archipelago; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States*, 1909.

In addition to the above, the following name has been proposed for a wild swine from Vladivostock, regarded by its describer as a continental race of the present species:—

Sus leucomystax *var.* continentalis, *Nehring*, *Sitzber. Ges. Nat. Freunde*, 1889, p. 141.

## IV. SUS VITTATUS.

Sus vittatus, *Müller and Schlegel*, *Verh. Zoogd. Ind. Archip.* vol. i, p. 172, pl. xxix, 1842; *Gray*, *Proc. Zool. Soc.* 1860, p. 442, 1868, p. 25, *Cat. Carnivora, etc. Brit. Mus.* p. 331, 1869; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 277, 1862; *Major*, *Zool. Anz.* vol. vi, p. 296, 1883; *Jentink*, *Notes Leyden Mus.* vol. xiii, p. 89, 1891, vol. xxvi, p. 175, 1905; *Lydekker*, *Horns and Hoofs*, p. 359, 1893, *Game Animals of India, etc.* p. 284, 1907; *Miller*, *Proc. U.S. Nat. Mus.* vol. xxvi, p. 446, 1903, vol. xxx, p. 748, 1906; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 69, 1899; *Volz. Zool. Jahrb., Syst.* vol. xx, p. 513, 1904; *Steck*, *Rev. Suisse Zool.* vol. xiv, p. 33, 1907; *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiv, p. 628, 1908; *Bauschke*, *Arch. Naturgesch.* 1911, p. 1.

Sus scrofa, *var. Giebel*, *Säugethiere*, p. 225, 1855.

Aulacochœrus vittatus, *Gray*, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 58, 1873.

Type of *Aulacochœrus.*

Typical locality Sumatra.

Type in Leyden Museum.

General colour dark brown variegated with reddish brown,

with a black spinal stripe, rising into a crest on the neck, where the bristles are tipped with rufous; typically a broad reddish brown band along middle of muzzle, broadening at angles of mouth and on sides of upper lip, whence it extends backwards to disappear on sides of neck, in old animals frequently obsolete; no warts or tufts on face; ears moderate; tail-tuft small and flattened; young striped with alternating black and reddish brown bands; canines as in *S. scrofa* (p. 310); skull of moderate length and slenderness, but of unusual height, owing to the depth of the lower jaw, with a short muzzle, in which the anterior upper premolar is approximated to the canine, while the interval between the first and second lower premolars, like that between the canine and outermost lower incisor, is also unusually short; last molar in each jaw short and simple.

The range includes Sumatra, Java, Flores, the Malay Peninsula, etc.

The following "key" to the local races (with the exception of the third and last) is modified from one given by Miller.

A. Upper skull-length less than 11½ inches (290 mm.).*
  *a*. Length of upper tooth-row about $3\frac{5}{16}$ inches (83 mm.) ..... *S. v. andamanensis.*
  *b*. Length of upper tooth-row about $3\frac{3}{4}$ inches (95 mm.).
    $b^1$. Palate wider..... *S. v. nicobaricus.*
    $c^1$. Palate narrower, the width not greater than maximum width of m. 3 ..... *S. v. mimus.*
B. Upper skull-length exceeding 11½ inches (290 mm.).
  *a*. Upper molars larger..... *S. v. niadensis.*
  *b*. Upper molars smaller.
    $b^1$. Width of palate (last molars included) less than half the length of upper tooth-row to point of tusk.
      $b^2$. Width of parietal constriction greater.
        $b^3$. General colour yellower ..... *S. v. milleri.*
        $c^3$. General colour redder ..... *S. v. vittatus.*
      $c^2$. Width of parietal constriction less.
        $c^3$. Colour greyer, teeth smaller..... *S. v. andersoni.*
        $d^3$. Colour redder, teeth larger ..... *S. v. rhionis.*

* *S. v. floresianus* should come in this group.

$c^1$. Width of palate (last molars included) equal to or greater than half the length of upper tooth-row to front of tusk.
$c^2$. Skull-length about 13½ inches (342 mm.)..... *S. v. peninsularis.*
$d^2$. Skull-length about 12¼ inches (310 mm.).
$d^3$. A small diastema behind tusk..... *S. v. babi.*
$e^3$. No diastema behind tusk..... *S. v. natunensis.*

## A.—Sus vittatus vittatus.

Typical locality Sumatra.

Bristles of head and body subterminally ringed with reddish brown, which communicates a rufous tinge to the entire coat.

43. 12. 27. 1 (1362. *a*). Skin, mounted. Locality unknown, and reference provisional.

*Purchased* (*Franks*), 1843.

## B.—Sus vittatus milleri.

Sus milleri, *Jentink*, *Notes Leyden Mus.* vol. xxvi, p. 176, 1905.

Typical locality Java.

Type in Leyden Museum.

Yellower and lighter than typical race, with the light band on the muzzle yellowish brown; bristles on head and body more sparse, with the subterminal ring yellowish brown.

55. 4. 14. 1 (1362, *b*). Skull. Java; collected by Dr. A. R. Wallace, O.M. Noticed by Major, *Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 532. *Purchased*, 1855.

## C.—Sus vittatus floresianus.

Sus floresianus, *Jentink*, *Notes Leyden Mus.* vol. xxvi, p. 178, 1905.

Typical locality Flores.

Type in Leyden Museum.

Described from the skull, which, although smaller than in the typical race—upper length 10¼ inches (260 mm.), against 13 inches (330 mm.)—is very thick, massive, short, and wide, with a bony maxillary protuberance below the

infra-orbital foramen, and the premaxillæ terminating abruptly in front of the incisors instead of being prolonged some distance in advance.

No specimen in collection.

## D.—Sus vittatus andamanensis.

Sus andamanensis, *Blyth*, *Journ. Asiat. Soc. Bengal*, vol. xxvii, p. 267, 1858, vol. xxviii, p. 271, 1859, vol. xxix, p. 103, 1860, *Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 141, 1863; *Gray*, *Proc. Zool. Soc.* 1868, p. 29, *Cat. Carnivora, etc. Brit. Mus.* p. 336, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 64, 1873; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 195, 1891; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 562, 1891; *Lydekker*, *Horns and Hoofs*, p. 358, 1893; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 69, 1899; *Miller*, *Proc. U.S. Nat. Mus.* vol. xxiv, p. 752, 1902, vol. xxx, p. 754, 1906.

Sus cristatus andamanensis, *Lydekker*, *Great and Small Game of India*, *etc.* p. 265, 1900.

Sus vittatus andamanensis, *Major*, *Zool. Anz.* vol. vi, p. 296, 1883; *Lydekker*, *Game Animals of India*, *etc.* p. 284, 1907.

Typical locality Port Blair, S. Andaman Island.

Type in Indian Museum, Calcutta.

A small race, standing about 20 inches at the shoulder, and externally very similar to a dwarf *S. cristatus*, but distinguished from that species by the simpler structure of the last molar, which in the upper jaw normally carries only two transverse ridges and a talon; general colour blackish, with a brown tinge on the mane.

Miller, although regarding it as a member of the *S. vittatus* group, emphasises the affinity of this race to the Tenasserim form of *S. cristatus*.

67. 6. 18. 1 (1497, *a*). Skull, wanting lower jaw. Andaman Islands. A lower jaw (1497, *f*) sent with this specimen represents another individual.

*Presented by W. Theobald, Esq.*, 1867.

67. 9. 28. 6 (1497, *b*). Skull, female, wanting tusks. Same locality. *Same history.*

68. 3. 21. 78 (1479, *c*). Skin and skeleton. Andamans; collected by Capt. Frain.

*Purchased* (*Zoological Society*), 1868.

67. 10. 5. 22. Skin, very young, mounted. Zoological Gardens. *Purchased* (*Zoological Society*), 1867.

70. 8. 17. 2 (1497, *d*). Skull, female. Andamans. *Presented by Surgeon-General F. Day,* 1870.

88. 3. 20. 3. Skull. Andamans; collected by Dr. F. Stoliczka. *Presented by R. Lydekker, Esq.,* 1888.

## E.—Sus vittatus nicobaricus.

Sus nicobaricus, *Miller, Proc. U.S. Nat. Mus.* vol. xxiv, p. 755, 1902, vol. xxx, p. 754, 1906.

Sus vittatus nicobaricus, *Lydekker, Game Animals of India, etc.* p. 284, 1907.

Typical locality Great Nicobar Island.

Type in U.S. National Museum, Washington.

Rather larger than *S. v. andamanensis,* with markedly larger cheek-teeth; colour wholly black; tail with a sparse, nearly uniform growth of long black hairs.

No specimen in collection.

## F.—Sus vittatus peninsularis.

Sus peninsularis, *Miller, Proc. U.S. Nat. Mus.* vol. xxx, p. 749, 1906.

Sus vittatus peninsularis, *Lydekker, Game Animals of India, etc.* p. 284, 1907.

Typical locality Johore, Malay Peninsula.

Type in U.S. National Museum, Washington.

The largest of all the races, the upper skull-length being about 13½ inches (342 mm.).

No specimen in collection.

## G.—Sus vittatus rhionis.

Sus rhionis, *Miller, Proc. U.S. Nat. Mus.* vol. xxx, p. 749, 1906, vol. xxxi, p. 256, 1906; *Thomas and Wroughton, Journ. Fed. Malay Mus.* vol. i, p. 127, 1910.

Typical locality Karimon Island, Rhio Linga Archipelago.

Type in U.S. National Museum, Washington.

Skull narrower than in typical race, with the interparietal constriction so strongly developed that its width is less than that of the nasals at their base.

9. 4. 1. 508. Skull and skin. Karimon Island, Rhio Linga Group; collected by H. C. Robinson, Esq. *Presented by the Government of the Federated Malay States,* 1909.

## H.—Sus vittatus andersoni.

Sus andersoni, *Thomas and Wroughton, Ann. Mag. Nat. Hist.* ser. 8, vol. iii, p. 441, 1909, *Journ. Fed. Malay Mus.* vol. iv, p. 127, 1910.

Typical locality Batam Island, Rhio Linga Archipelago; the range also includes Bintang and Karimon Islands.

Differs from *S. v. rhionis* by the greyer colour of the adult and the redder tint of the young, as well as by the smaller teeth, especially the second upper incisor and the premolars.

9. 4. 1. 509. Skull and skin, female. Bintang Island, Rhio Linga Archipelago; collected by Mr. E. Seimund. *Presented by the Government of the Federated Malay States*, 1909.

9. 4. 1. 510. Skull and skin, female. Batam Island, Rhio Linga Group; same collector. *Same history.*

9. 4. 1. 511. Skull and skin, female. Same locality and collector. Type. *Same history.*

9. 4. 1. 512. Skull and skin, female. Karimon Island, Rhio Linga Group. *Same history.*

## I.—Sus vittatus niadensis.

Sus niadensis, *Miller, Proc. U.S. Nat. Mus.* vol. xxx, p. 751, 1906.

Typical locality Nias Island.

Type in U.S. National Museum, Washington.

Like typical race, but with larger second and third molars.

No specimen in collection.

## J.—Sus vittatus babi.

Sus babi, *Miller, Proc. U.S. Nat. Mus.* vol. xxx, p. 752, 1906.

Typical locality Pulo Babi, off western Sumatra.

Type in U.S. National Museum, Washington.

Similar in size to typical race, but colour much darker and skull wider.

No specimen in collection.

## K.—Sus vittatus natunensis.

Sus, *sp.*, *Thomas and Hartert*, *Novit. Zool.* vol. i, p. 660, 1894, vol. ii, p. 492, 1895.

Sus natunensis, *Miller*, *Proc. Washington Ac. Sci.* vol. iii, p. 117, 1901, *Proc. U.S. Nat. Mus.* vol. xxx, p. 753, 1906.

Typical locality Pulo Laut, northern Natuna Islands.

Type in U.S. National Museum, Washington.

Like *S. v. babi*, but colour lighter, and rostral portion of skull shorter and wider. In general appearance very similar to the small Tenasserim form of the typical race of *S. cristatus*, but smaller; general colour brownish, contrasting strongly with the black feet and legs.

No specimen in collection.

## L.—Sus vittatus mimus.

Sus mimus, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxx, p. 753, 1906.

Typical locality Simalur Island, off western Sumatra.

Type in U.S. National Museum, Washington.

Similar in colour and skull-characters to *S. v. babi*, but much smaller.

No specimen in collection.

## M.—Sus vittatus timoriensis.

Sus timoriensis, *Müller and Schlegel*, *Verh. Zoogd. Ind. Archip.* vol. i, pp. 42, 173 and 178, pl. xxxi, figs. 1–3, 1842; *Jentink*, *Notes Leyden Mus.* vol. xiii, p. 95, 1891, vol. xxvi, p. 180, 1905.

Sus scrofa, *var. Giebel*, *Säugethiere*, p. 225, 1855.

Sus timorensis, *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 278, 1862; *Gray*, *Proc. Zool. Soc.* 1868, p. 28, *Cat. Carnivora, etc. Brit. Mus.* p. 335, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 60, 1873.

Typical locality Timor; the range also includes Rottia, but not Macassar or Ternate, which are inhabited respectively by *S. celebensis* and "*S. niger*."

Probably a hybrid form, crossed with semi-domesticated breeds; the skull, according to Jentink, being markedly different from that of the pure-bred *S. v. floresianus*.

No specimen in collection.

The Papuan swine described under the following names are regarded by Stehlin (*Abh. schweiz. pal. Ges.* vol. xxvi, p. 292, 1899) and Bauschke (*Arch. Naturgesch.* vol. lxxvii, p. 1, 1911) as the descendants of domesticated or semi-domesticated animals introduced by human agency; the latter writer considering that they are all derivatives from the *S. vittatus* stock. In the Bismarck and Caroline groups more or less pure-bred *S. vittatus* occurs in a feral condition.

Sus papuensis, *Lesson and Garnot, Bull. Sci. Nat.* vol. vii, pp. 80 and 96, 1826, *Voyage "Coquille,"* vol. i, p. 171, pl. viii, 1826; *Gray, List Mamm. Brit. Mus.* p. 135, 1843, *Proc. Zool. Soc.* 1858, p. 107, 1868, p. 33, *Cat. Carnivora, etc. Brit. Mus.* p. 339, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 60, 1873; *Peters and Doria, Ann. Mus. Genova,* vol. xvi, pp. 666 and 698, 1881; *Sclater, Proc. Zool. Soc.* 1881, p. 165; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 347, 1884; *Finsch, Proc. Zool. Soc.* 1886, p. 218; *Jentink, Notes Leyden Mus.* vol. xiii, p. 97, 1891, vol. xxvi, p. 188, 1905; *Meyer, Abh. Zool. Mus. Dresden,* vol. vi, p. 18, 1897; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 31, 1907; *Bauschke, Arch. Naturgesch.* 1911, p. 1; *Dehaut, Zool. et Pal. Corse et Sardaigne,* p. 64, pl. iv, 1912.

Sus ternatensis, *Meyer, Trans. Linn. Soc.* ser. 2, vol. i, p. 276, 1877.

Sus aruensis, *Rosenberg, Malay Archip.* p. 362, 1878.

Sus aramensis, *Rosenberg, op. cit.* p. 368, 1878.

Sus niger, *Finsch, Proc. Zool. Soc.* 1886, p. 217; *Jentink, Notes Leyden Mus.* vol. xiii, p. 100, 1891, vol. xxvi, p. 190, 1905; *Meyer, Abh. Zool. Mus. Dresden,* vol. vi, p. 18, 1896.

Typical locality New Guinea; also recorded from the Admiralty and Bismarck groups, Jappen, Waigiou, Misul, Ternate, Salawatti, Tidore, Ceram, Batanta, and the Key, Aru, Yule, and Louisiade groups.

Type in Paris Museum.

949, *a*. Skin, female, mounted. New Guinea.

*Presented by the Earl of Derby,* 1843.

50. 7. 20. 134 (50. 9. 6. 15—949, *b*). Skin, mounted, and skull, immature. Touton Island, south coast of New Guinea.

*Presented by Capt. Owen Stanley,* 1850.

60. 8. 27. 8 (1501, *a*). Skull, immature, provisionally referred to the present group. Locality unknown (? Ternate); collected by Dr. A. R. Wallace, O.M.

*Purchased* (*Stevens*), 1860.

61. 12. 11. 25 (1501, *b*). Skull. Ternate; same collector. Entered in Gray's *Hand-List* as *S. timorensis;* referred by

Major, *Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 534, to a species akin to *S. vittatus.* *Purchased*, 1861.

66. 12. 30. 4 (1501, *d*). Skin and skeleton. Dampier Straits, north-west New Guinea; collected by R. Swinhoe, Esq. *Purchased (Zoological Society)*, 1866.

90. 2. 20. 11–13. Three skulls. Wild Island, Admiralty group; collected in 1875 during the cruise of H.M.S. "Challenger." *Presented by the Government*, 1890.

13. 6. 18. 113–115. Three skulls and skins. Letakusa Valley, New Guinea; collected by C. B. Kloss, Esq. *Presented by the Wollaston Expedition*, 1913.

13. 6. 18. 116–118. Three skulls. Same locality and collector. *Same history.*

## V. SUS CELEBENSIS.

Sus celebensis, *Müller and Schlegel, Verh. Zoogd. Ind. Archip.* pl. xxviii bis, fig. 1, 1842; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 331, 1869; *Nehring, Sitzber. Ges. nat. Freunde*, 1888, p. 9, *Abh. Zool. Mus. Dresden*, 1889, p. 11, pls. i and ii, *Zool. Anz.* vol. xiv, p. 45, 1891; *Jentink, Notes Leyden Mus.* vol. xiii, p. '96, 1891, vol. xxvi, p. 182, 1905; *Meyer, Abh. Zool. Mus. Dresden*, vol. vi, p. 27, 1896; *Stehlin, Abh. schweiz. pal. Ges.* vol. xxvi, p. 70, pl. x, 1899; *Trouessart, Cat. Mamm., Suppl.* p. 662, 1904; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 32, 1907.

Dasychœrus celebensis, *Gray, Hand-List Thick-skinned Mamm. Brit. Mus.* p. 59, 1873.

Sus verrucosus celebensis, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 537, 1897; *Trouessart, Cat. Mamm.* p. 895, 1898.

Typical locality Northern Celebes.

Type in Leyden Museum.

According to Jentink, the wild swine of Celebes is to a considerable degree intermediate between *S. vittatus* and *S. verrucosus*, having the facial markings and striped young of the former and lower canines like those of the latter.

Typically a distinct tuft of light-coloured bristles on hind portion of each cheek; in half-grown individuals a broad yellowish or brownish band on the sides of the muzzle, and thence towards under surface of neck, this band being more or less visible in adults; a pair of small warts on muzzle above angles of mouth; a crest of long black bristles between ears, continued along nape; young striped; skull

short and high; lower canines of the type of those of *S. verrucosus* (*infra*); enamel of molars thick.

In addition to Celebes, the range includes Menado, Gorontalo, Saleyer, Batjan, Morotaï, and Macassar, and the Philippines.

The races are distinguishable as follows.—

A. Size medium; premolars low.
  *a*. Skull medium.
    *a'*. Cheek-teeth larger ..... *S. c. celebensis.*
    *b'*. Cheek-teeth smaller ..... *S. c. nehringi.*
  *b*. Skull longer and lower ..... *S. c. philippinus.*
  *c*. Skull still longer and lower ..... *S. c. mindanensis.*
  *d*. Skull very narrow and relatively low ..... *S. c. ceramicus.*
  *e*. Skull broader.
    *e'*. Skull higher ..... *S. c. amboinensis.*
    *e''*. Skull lower ..... *S. c. borneënsis.*
B. Size small; premolars tall ..... *S. c. minutus.*

## A.—Sus celebensis celebensis.

Typical locality Northern Celebes.

General characters those of the species.

In addition to Northern Celebes, the range is taken to include Menado, Gorontalo, Batjan, Morotaï, and Macassar.

43. 12. 27. 2 (1596, *b*). Skin, mounted, immature. Celebes. *By exchange with the Leyden Museum*, 1843.

47. 5. 10. 2 (1596, *a*). Skin, mounted, and skull. Celebes. *Same history*, 1847.

59. 4. 6. 4 (1501, *c*). Skull, immature. Macassar; collected by Dr. A. R. Wallace, O.M. Entered as *S. timorensis* in Gray's *Hand-List*, but referred to present species by Major, *Ann. May. Nat. Hist.* ser. 6, vol. xix, p. 522. *Purchased* (*Franks*), 1859.

61. 12. 11. 26 (1362, *h*). Skull. Batjan (Batchian); collected by Dr. A. R. Wallace, O.M. Entered in Gray's *Hand-List* as *Aulochœrus cittatus*. *Purchased*, 1861.

72. 3. 5. 4. Skin, young. Macassar; collected by Dr. A. B. Meyer. *Purchased*, 1872.

## B.—Sus celebensis nehringi.

Sus nehringii, *Jentink, Notes Leyden Mus.* vol. xxvi, p. 186, 1905.
(?) Sus weberi, *Jentink, op. cit.* p. 187, 1905.

Typical locality Southern Celebes.

Type in Leyden Museum.

Closely allied to typical race, but the cheek-teeth, especially the molars, decidedly smaller. *S. weberi*, from the adjacent island of Saleyer, was only provisionally separated by Jentink.

No specimen in collection.

## C.—Sus celebensis philippensis.

Sus celebensis, *var.* philippensis, *Nehring, Sitzber. Ges. nat. Freunde*, 1886, p. 83, 1890, p. 9, 1894, p. 220, *Abh. Zool. Mus. Dresden*, 1889, pp. 14 and 24, pls. i and ii.

Sus marchei, *Huet, Le Naturaliste*, vol. ii, p. 6, 1888, partim.

Sus arietinus, *Heude, Mém. Hist. Nat. Emp. Chinois.* vol. ii, p. 114, pl. xx, fig. 1, 1892.

Sus microtis, *Heude, op. cit.* p. 115, pl. xx, B, fig. 6, 1892.

Sus frenatus, *Heude, op. cit.* p. 114, pl. xxvii, figs. 1–3, 1892.

Sus verrucosus philippensis, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 527, 1897.

Sus philippensis, *Thomas, Trans. Zool. Soc.* vol. xiv, p. 411, 1898; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 39, 1912; *Cabrera, Cat. Met. Mam. Mus. Madrid.* p. 133, 1912.

Sus verrucosus philippinensis, *Trouessart, Cat. Mamm.* p. 825, 1899.

Sus celebensis philippinensis, *Trouessart, Cat. Mamm., Suppl.* p. 662, 1904.

Typical locality Luzon, Philippines; also recorded from Basilan, Mindanao, Mindoro, Negros, Panay, Samar, etc.

Type in Berlin Museum.

Skull lower and more elongated than in typical race, with a narrower muzzle, and a thinner and lower bony crest above the upper canine; molars of average size and complexity, and premolars not abnormally tall.

54. 3. 11. 7. Young skin of this or one of the other Philippine races. Philippines; collected by H. Cuming, Esq. *Purchased*, 1854.

97. 8. 4. 1. Skull and skin. Cap Ingaño, North Luzon. *Presented by J. Whitehead, Esq.*, 1897.

### D.—Sus celebensis minutus.

Sus minutus, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 114, pl. xx, B, fig. 1, 1892, vol. iv, p. 127, 1899; *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 528, 1897; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 39, 1912.

Typical locality Luzon.

Smaller than the preceding and following races, with relatively small and simple molars, and large tall premolars.

No example in collection.

### E.—Sus celebensis mindanensis.

Sus inconstans, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 67, 1892, description insufficient; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 39, 1912.

Sus verrucosus mindanensis, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 527, 1897.

Sus celebensis mindanensis, *Trouessart, Cat. Mamm. Suppl.* p. 662, 1904.

Sus mindanensis, *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 39, 1912.

Typical (and only) locality Mindanao, Philippines.

Skull still longer, lower, and narrower than in *S. c. philippensis*, and the muzzle more elongated. In the Luzon race the relative maximum width of skull is from 51·2 to 52 mm., and the length of the muzzle from 23·8 to 24·7 mm., whereas in the present race these dimensions are respectively 48·3 and 26·4 mm.

Major remarks that the characters by which *S. c. philippensis* and *S. c. mindanensis* differ from *S. v. celebensis* tend to approximate the two former to *S. verrucosus*.

91. 11. 28. 3. Skull and skin. Ayala, Mindanao; collected by the Steere Expedition. Type. *Purchased*, 1891.

7. 2. 2. 15. Skull and skin. Mount Apo, Mindanao; collected by M. P. Anderson, Esq.
*Presented by the Duke of Bedford, K.G.*, 1907.

7. 2. 2. 16. Skull, wanting nasals. Same locality and collector. *Same history.*

7. 2. 2. 17. Skull, wanting nasals, and skin, immature. Same locality and collector. *Same history.*

7. 2. 2. 18. Skull and skin, immature. Same locality and collector. *Same history.*

## F.—Sus celebensis amboinensis.

Aulochœrus vittatus, *Gray, Hand-List Thick-skinned Mamm. Brit. Mus.* p. 58, pl. xxiv, fig. 3, 1873; nec *Müller and Schlegel.*

Sus verrucosus, *Rolleston, Trans. Linn. Soc.* ser. 2, vol. i, p. 271, 1877; nec *Müller and Schlegel.*

Sus verrucosus amboinensis, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 527, 1897.

Sus celebensis amboinensis, *Trouessart, Cat. Mamm., Suppl.* p. 662, 1904.

Sus amboinensis, *Jentink, Notes Leyden Mus.* vol. xxvi, p. 193, 1905.

Typical locality Amboina, west of Ceram.

Skull higher and broader than in *S. c. philippensis,* and thus still more so than in *S. c. mindanensis,* with a relatively long postorbital region; in length of muzzle nearly intermediate between *S. verrucosus* and *S. c. ceramicus.*

59. 4. 6. 5* (1362, *d*). Skull. Amboina; collected by Dr. A. R. Wallace, O.M. Co-type. Figured by Gray, *loc. cit.* *Purchased,* 1859.

59. 4. 6. 6 (1362, *c*). Skull. Same locality and collector. Co-type. *Same history.*

## G.—Sus celebensis ceramicus.

Sus verrucosus *var.* ceramicus, *Gray, Proc. Zool. Soc.* 1868, p. 24, *Cat. Carnivora, etc. Brit. Mus.* p. 330, 1869; *Meyer, Abh. Zool. Mus. Dresden,* vol. vi, p. 18, 1896.

Dasychœrus verrucosus, *Gray, Hand-List Thick-skinned Mamm. Brit. Mus.* p. 59, 1873.

Sus verrucosus, *Rolleston, Trans. Linn. Soc.* ser. 2, vol. i, p. 271, 1874.

Sus verrucosus ceramicus, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 533, 1897.

Sus celebensis ceramicus, *Trouessart, Cat. Mamm., Suppl.* p. 662, 1904.

Sus ceramicus, *Jentink, Notes Leyden Mus.* vol. xxvi, p. 193, 1905.

Typical locality Ceram.

Skull with very slender muzzle, narrower across zygomatic arches than that of any other member of the group, and in relative height inferior to all except *S. c. mindanensis;* nasal region extremely narrow, and crest above canine small and

* Major gave the number of this and the next specimen as 59. 6. 4. 5 and 59. 6. 4. 6.

weak; last molar long and simple, resembling in the former character *S. verrucosus* and in the latter the typical *S. c. celebensis* and *S. c. amboinensis*.

55. 4. 14. 2 (712, *d*). Skull. Ceram; collected by Dr. A. R. Wallace, O.M. Type. *Purchased*, 1855.

### H.—Sus celebensis borneënsis.

Sus vittatus, *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 277, 1862; nec *Müller and Schlegel.*

Sus verrucosus, *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 330, 1867.

Dasychœrus verrucosus, *Gray, Hand-List Thick-skinned Mamm. Brit. Mus.* p. 59, 1873.

Sus verrucosus borneensis, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 534, 1897.

Sus celebensis borneensis, *Trouessart, Cat. Mamm., Suppl.* p. 662, 1904.

Sus borneensis, *Jentink, Notes Leyden Mus.* vol. xxvi, p. 193, 1905.

Typical locality Borneo.

Skull short and broad, of the type of that of *S. c. celebensis* and *S. c. amboinensis* (and thus altogether different from that of *S. c. ceramicus*), but less elevated, and with a shorter incisor-area; crests above upper canines moderate, as in *S. verrucosus*.

59. 8. 16. 5 (1362, *a**). Skull. Borneo; collected by Dr. A. R. Wallace, O.M. Type. *Purchased*, 1859.

#### Incertæ Sedis.

Neosus cebifrons, *Heude, Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 106, 1892.

Sus cebifrons, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 527, 1897; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 38, 1912, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 338, 1913.

Typical locality Masbate or Cebu, Philippines.

Regarded by Major as probably a cross between a wild and a domesticated pig.

No specimen in collection.

## VI. SUS VERRUCOSUS.

Sus verrucosus, *Müller and Schlegel, Verh. Zoogd. Ind. Archip.* vol. i, p. 107, pls. xxviii and xxxii, 1842; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 330, 1869; *Jentink, Notes Leyden Mus.*

* Misprinted 136, *a* in Gray's *Hand-List.*

vol. xiii, p. 93, 1891, vol. xxv, p. 168, 1905; *Lydekker*, *Horns and Hoofs*, p. 360, 1893, *Game Animals of India, etc.* p. 283, 1907; *Major*, *Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 521, 1897; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 70, 1899; *Steck*, *Rev. Zool. Suisse*, vol. xiv, p. 33, 1907.

Sus scrofa, *var. Giebel*, *Säugethiere*, p. 225, 1855.

Dasychœrus verrucosus, *Gray*, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 59, 1873.

Sus mystaceus, *Gray*, *op. cit.* p. 62, pl. xxv, 1873.

Type of *Dasychœrus*.

Typical locality Java.

Type in Leyden Museum.

Head elongated, with three pairs of warty protuberances, surmounted with bristles, one situated above the upper canines, the second and larger under each eye, and the third and largest a little below the ears; a nuchal and dorsal crest, gradually diminishing in height towards the tail; ears relatively large and wide, with the basal portion forming a closed cylinder; tail without distinct terminal tuft; general colour black, but certain bands on head and the whole under-parts rufous; young uniformly coloured; muzzle bare and flesh-coloured; last molars very large and complex; lower canines (fig. 48, p. 310), with the hind surface horizontal, and narrower than the outer one, which is the broadest of the three; skull of medium length and height, with two infra-orbital foramina.

55. 4. 2. 2–3 (712, *e*). Skull, wanting upper canines. Java. *Purchased* (*Stevens*), 1855.

62. 1. 22. 2 (712, *e*). Skin, mounted, and skeleton, immature (? semi-domesticated). Java. Type of *S. mystaceus*. *Purchased* (*Zoological Society*), 1862.

67. 4. 12. 211 (712, *f*). Skull. Java (?). *Lidth de Jeude Collection, purchased*, 1867.

67. 4. 12. 212 (712, *i*). Skull. Java (?). *Same history.*

67. 4. 12. 213 (1362, *g*). Skull, immature. Java (?); entered in Gray's *Hand-List* as *S. vittatus;* referred to the present species by Major, *Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 539 (on p. 532 it is apparently referred to *S. v. celebensis*). *Same history.*

67. 4. 12. 214 (712, *h*). Skull, wanting several teeth. Java (?). *Same history.*

67. 4. 12. 215 (712, *g*). Skull. Java (?). *Same history.*

67. 4. 12. 218 (1362, *f*). Skull, immature female. Java (?). Entered in Gray's *Hand-List* as *S. vittatus;* referred to present species by Major, *op. cit.* *Same history.*

9. 1. 5. 814–5. Two skulls and skins, young. Pangandaran, Dirk de Vries Bay, Java; collected by G. C. Shortridge, Esq. *Presented by W. E. Balston, Esq.*, 1909.

9. 1. 5. 816. Skull and skin (?), female. Same locality and collector. *Same history.*

9. 1. 5. 817. Skull, wanting part of lower jaw, and skin. Same locality and collector. *Same history.*

9. 1. 5. 818. Skull and skin, immature. Same locality and collector. *Same history.*

9. 1. 5. 819–20. Two skulls and skins, very young. Same locality and collector. *Same history.*

9. 1. 5. 821. Skull and skin, immature. Same locality and collector. *Same history.*

9. 1. 5. 822. Skull and skin. Tjilatjap, Java; same collector. *Same history.*

9. 1. 5. 827. Skull and skin. Same locality and collector. *Same history.*

9. 1. 5. 828–9. Two skulls and skins, very young. Same locality and collector. *Same history.*

9. 1. 5. 831. Skull and skin, young. Same locality and collector. *Same history.*

9. 1. 5. 832. Skull and skin. Kalipoetjang, Tji-Tandoei Valley, Java; same collector. *Same history.*

9. 1. 5. 833. Skull, imperfect, and skin, immature. Same locality and collector. *Same history.*

9. 1. 5. 1120. Skull, imperfect, female. Western Java; same collector. *Same history.*

9. 1. 5. 1121. Skull, immature. Same locality and collector. *Same history.*

9. 1. 5. 1222–3. Two skulls, without lower jaws, immature. Same locality and collector. *Same history.*

## VII. SUS BARBATUS.

Sus barbatus, *Müller, Tijdschr. Gesch. Physiol.* vol. v, p. 149, 1839, *Verh. Zoogd. Ind. Archip.* vol. i, pp. 42, 173 and 179, pl. xxx and xxxi, 1842; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 278,

1862; *Gray*, *Proc. Zool. Soc.* 1868, p. 32, *Cat. Carnivora, etc. Brit. Mus.* p. 339, 1869; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 347, 1884; *Nehring*, *Sitzber. Ges. nat. Freunde*, 1886, p. 82; *Jentink*, *Notes Leyden Mus.* vol. xiii, p. 94, 1891, vol. xxvi, p. 161, 1905; *Lydekker*, *Horns and Hoofs*, p. 360, 1893; *Hose*, *Mamm. Borneo*, p. 69, 1893; *Jentink and Büttikofer*, *Notes Leyden Mus.* vol. xix, p. 65, 1897; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 70, 1899; *Volz*, *Zool. Jahrb., Syst.* vol. xx, p. 518, pl. xviii, 1904; *Miller*, *Proc. U.S. Nat. Mus.* vol. xxx, p. 739, 1906; *Lyon*, *ibid.* vol. xxxiii, p. 550, 1907, vol. xl, p. 74, 1911.

Euhys barbatus, *Gray*, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 57, 1873.

Sus longirostris, *Nehring*, *Zool. Anz.* vol. viii, p. 347, 1885, *Sitzber. Ges. nat. Freunde*, 1886, p. 80, *Abh. Zool. Mus. Dresden*, 1889, p. 18; *Spillner*, *Ber. Physiol. Lab. Halle*, 1894, p. 81; *Miller*, *Proc. Biol. Soc. Washington*, vol. xv, p. 51, 1902; *Volz*, *Zool. Jahrb., Syst.* vol. xx, pp. 511 and 516, 1904 (= barbatus).

Type of *Euhys*.

Typical locality Banjermassin, Borneo.

Type in Leyden Museum.

Size large; head very long, low, and narrow, with the tip of the muzzle bare, and tufts of long, curved, reddish brown bristles on cheeks; ears small, slit to the base; tail with a large black terminal tuft; general colour variable, ranging from uniformly brownish yellow to black; young striped; canines as in *S. verrucosus* (p. 310); skull long and low, with a very slender muzzle, the tip of the premaxillæ extending a short distance in advance of the incisors, instead of ending abruptly with them, and a single infra-orbital foramen on each side. The strongly developed tufts on the cheeks, the bare flesh-coloured muzzle, small, oval ears, and large tail-tuft are characteristic.

The range includes Borneo, Sumatra, and the Philippines.

The races are distinguishable as follows:—

A. Upper skull-length from $18\frac{1}{8}$ to $20\frac{1}{8}$ inches (460 to 510 mm.).
  *a*. Size larger.
    *a'*. Last lower molar complex (3 ridges)..... *S. b. barbatus.*
    *b'*. Last lower molar simple (2 ridges)..... *S. b. oi.*
  *b*. Size smaller.
    *b'*. Skull short and wide..... *S. b. ahœnobarbus.*
    *c'*. Skull still wider..... *S. b. calamianensis.*
    *d'*. Skull longer and narrower..... *S. b. balabacensis.*
B. Upper skull-length $22\frac{1}{2}$ inches (570 mm.)..... *S. b. gargantua.*

## A.—Sus barbatus barbatus.

Typical locality Banjermassin, Borneo.

Size large; last lower molar complex, with three complete transverse ridges and a talon.

The range includes several small islands near Borneo.

47. 5. 11. 1 (712, *b*). Skull, immature. Borneo.
*Presented by Capt. Sir Edward Belcher, R.N.*, 1847.

55. 12. 26. 153 (1982, *a* = 712, *a*). Skull, wanting some of the anterior teeth. Borneo.
*Presented by Raja Sir James Brooke*, 1855.

90. 6. 25. 10. Skull. Baram, N.W. Borneo; collected by A. H. Everett, Esq. *Purchased*, 1890.

92. 9. 4. 15. Skull. Baram; collected by Dr. C. Hose.
*Purchased*, 1892.

92. 9. 4. 16. Skull. Nish, Baram; same collector.
*Same history.*

95. 11. 5. 8. Skeleton. Baram; same collector.
*Purchased*, 1895.

97. 6. 2. 1. Skull and scalp-skin, female. Kuching, Sarawak; collected by Mr. E. Bartlett. *Purchased*, 1897.

97. 6. 2. 2. Skull, female. Same locality and collector.
*Same history.*

97. 6. 25. 1. Skin, mounted, and skull. Baram; collected by Dr. C. Hose. *Purchased* (*Gerrard*), 1897.

0. 3. 30. 10. Skeleton. Marudi, Sarawak; same collector. A very large boar. *Purchased* (*Gerrard*), 1900.

0. 3. 30. 11. Skull. Baram, Sarawak; same collector.
*Same history.*

0. 3. 30. 12. Skull. Same locality and collector.
*Same history.*

0. 3. 30. 13. Skull, female. Sarawak; same collector.
*Same history.*

0. 3. 30. 14. Skull, female. Baram; same collector.
*Same history.*

0. 3. 30. 15. Skull, female. Same locality and collector.
*Same history.*

0. 3. 30. 16. Skull, female. Same locality and collector.
*Same history.*

0. 3. 30. 17. Skull, female. Same locality and collector.
*Same history.*

10. 4. 5. 132. Skull, immature. Barito Valley, south-central Borneo; collected by G. C. Shortridge, Esq.

*Presented by O. Thomas, Esq.*, 1910.

10. 4. 5. 133. Skull of a rather older individual. Same locality and collector. *Same history.*

10. 4. 5. 158. Skull. Same locality and collector.

*Same history.*

### B.—Sus barbatus gargantua.

Sus barbatus, *Nehring*, *Zool. Anz.* vol. viii, p. 347, 1885; *Volz*, *Zool. Jahrb.*, *Syst.* vol. xx, p. 518, 1904.

Sus gargantua, *Miller*, *Proc. U.S. Nat. Mus.* vol. xxx, p. 743, 1906.

Typical locality S.E. Borneo.

Type in U.S. National Museum, Washington.

Skull longer—upper length 22½ inches (570 mm.)—and lower than in typical race, with marked overhanging of the occipital surface.

No specimen in collection, unless Nos. 10. 4. 5. 132–3 and 10. 4. 5. 158, entered under the heading of the preceding race, should belong to the present one.

### C.—Sus barbatus oi.

Sus oi, *Miller*, *Proc. Biol. Soc. Washington*, vol. xv, p. 51, 1902, *Proc. U.S. Nat. Mus.* vol. xxx, p. 791, pls. xl, *etc.* 1906, vol. xxxi, p. 255, 1906; *Lydekker*, *Field*, vol. civ, p. 327, 1904; *Jentink*, *Notes Leyden Mus.* vol. xxvi, p. 155, pls. iii and iv, 1905; *Kloss*, *Journ. Straits Asiat. Soc.* vol. xlv, p. 5, 1906; *Lyon*, *Proc. U.S. Nat. Mus.* vol. xxxiv, p. 626, 1908; *Thomas and Wroughton*, *Journ. Fed. Malay Mus.* vol. i, p. 127, 1910.

Sus barbatus, *Volz*, *Zool. Jahrb.*, *Syst.* vol. xx, p. 518, 1902; *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 662, 1904; *Schneider*, *Zool. Jahrb.*, *Syst.* vol. xxiii, p. 128, 1905.

Typical locality Indragiri Valley, eastern Sumatra: also occurs on Pulo Kundur, Pulo Batam (opposite Singapore), and other islands in the Rhio Linga Archipelago.

Type in U.S. National Museum, Washington.

Stated to differ from typical Bornean race by the shortness of the last lower molar, which has two transverse ridges and a talon (which may be so large as to simulate a third ridge); and by the rather larger bodily size.

No specimen in collection.

## D.—Sus barbatus ahænobarbus.

Sus ahænobarbus, *Huet, Le Naturaliste*, vol. ii, p. 5, 1888, partim; *Nehring, Sitzber. Ges. nat. Freunde*, 1894, p. 190; *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 535, 1897; *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 32, 1907; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 38, 1912, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 338, 1913; *Dehaut, Zool. et Pal. Corse et Sardaigne*, p. 64, pl. iv, A, 1912.

Sus barbatus *var.* palavensis, *Nehring, Abh. Zool. Mus. Dresden*, 1889, pp. 22 and 32, *Sitzber. Ges. nat. Freunde*, 1890, p. 11; *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 535, 1907.

Sus barbatus ahænobarbus, *Trouessart, Cat. Mamm.* p. 894, 1899, *Suppl.* p. 662, 1904.

Sus barbatus palavensis, *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 38, 1912, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 338, 1913.

Typical locality Palawan, between Borneo and Mindoro, Philippines.

A dwarf race of the species, with a relatively short and wide skull, measuring 12 inches (304 mm.) in length, by $5\frac{3}{4}$ inches (145 mm.) in breadth.

The skull figured by Huet as that of the present race really belongs to his *S. marchei* (=*S. c. philippensis*), and *vice versâ*.

No specimen in collection.

## E.—Sus barbatus balabacensis.

Sus barbatus balabacensis, *Major, Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 534, 1897; *Hollister, Philippine Journ. Sci.* sect. D, vol. vii, p. 38, 1912, *Proc. U.S. Nat. Mus.* vol. xlvi, p. 338, 1913.

Typical locality Balabac, between Borneo and Palawan, Philippines.

Skull longer and narrower than that of *S. b. ahænobarbus*, the length being $12\frac{1}{4}$ inches (313 mm.), and the width 5 inches (126 mm.).

94. 6. 8. 7. Skull, aged female. Balabac; collected by A. H. Everett, Esq. *Purchased*, 1894.

94. 6. 8. 8. Skull. Same locality and collector. Type. *Same history.*

94. 6. 8. 9. Skull, old female. Same locality and collector. *Same history.*

94. 6. 8. 10. Skull, immature female. Same locality and collector. *Same history.*

### F.—Sus barbatus calamianensis.

Sus calamianensis, *Heude*, *Mém. Hist. Nat. Emp. Chinois*, vol. ii, p. 114, pl. xx B, fig. 2, 1892; *Hollister*, *Philippine Journ. Sci.* sect. D, vol. vii, p. 38, 1912.

Sus barbatus *var.* calamianensis, *Nehring*, *Sitzber. Ges. nat. Freunde*, vol. xxxvi, p. 191, 1894, *Zool. Garten*, p. 46, 1895; *Major*, *Ann. Mag. Nat. Hist.* ser. 6, vol. xix, p. 535, 1897.

Sus barbatus calamianensis, *Trouessart*, *Cat. Mamm.* p. 825, 1899.

Typical locality Calamianes, Philippines; also occurs on Calion Island, in the Calamianes group.

Skull broader than in *S. b. ahænobarbus*, the length being $12\frac{3}{8}$ inches (315 mm.), and the width 6 inches (146 mm.).

No specimen in collection.

## 2. Subgenus **PORCULA.**

Porcula, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. xvi, p. 423, 1847; *Gray*, *Proc. Zool. Soc.* 1868, p. 33.

Size very small; tail short; three pairs of teats.

Restricted to the forest-tract at the foot of the Eastern Himalaya.

## VIII. SUS (PORCULA) SALVANIUS.

Porcula salvania, *Hodgson*, *Journ. Asiat. Soc. Bengal*, vol. xvi, pp. 423 and 503, pls. xii and xiii, 1847, vol. xvii, pt. 2, p. 48, pl. xxvii, 1848, *Proc. Zool. Soc.* 1847, p. 115; *Horsfield*, *Proc. Zool. Soc.* 1853, p. 192, pl. xxxvii; *Gray*, *ibid.* 1868, p. 33, *Cat. Carnivora*, *etc. Brit. Mus.* p. 340, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 65, 1873; *Jerdon*, *Mamm. India*, p. 244, 1867; *Anderson*, *Proc. Zool. Soc.* 1869, p. 470; *Selater*, *ibid.* 1882, p. 546, pl. xxxvi; *Sterndale*, *Mamm. India*, p. 421, 1884; *W. L. Sclater*, *Cat. Mamm. Ind. Mus.* pt. ii, p. 195, 1891; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 28, pl. xvii, 1899; *Beddard*, *Proc. Zool. Soc.* 1909, p. 170.

Sus salvanius, *Garson*, *Proc. Zool. Soc.* 1883, p. 413; *Blanford*, *Fauna Brit. India*, *Mamm.* p. 363, 1891; *Flower and Lydekker*, *Study of Mammals*, p. 285, 1891; *Lydekker*, *Great and Small Game of India*, *etc.* p. 266, 1900, *Game Animals of India*, *etc.* p. 285, 1907.

Sus salvianus, *Trouessart*, *Cat. Mamm.* p. 827, 1898, errorim.

Sus (Porcula) salvianus, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 663, 1904.

Typical locality the Sikhim Tarai;* the range also includes that of Nepal and Bhutan.

* The moist forest-tract at the base of the eastern Himalaya.

Size very small, shoulder-height about $11\frac{1}{4}$ inches; no distinct spinal crest; ears small and bare; tail very short ($1\frac{1}{4}$ inches); no woolly under-fur; general colour brown or blackish brown: young striped; last upper molar in jaw very short, its length being considerably less than that of the two teeth immediately in front.

53. 8. 16. 16 (54. 6. 3. 7 [1077, *a*]). Skull, foot-bones, and mounted skin. Sikhim Tarai.

*Presented by B. H. Hodgson, Esq.*, 1853.

53. 8. 16. 17. Young skull and skin. Same locality. *Same history.*

1077, *b*. Skull. Same locality. *Same donor.*

58. 6. 24. 71 (1077, *d*). Skull and skin, the latter mounted. Same locality. *Same donor*, 1858.

58. 6. 24. 72 (1077, *c*). Skeleton. Same locality. Type; skull figured by Hodgson, *Journ. Asiat. Soc. Bengal*, vol. xvi, pl. xxiii. *Same history.*

79. 11. 21. 666 (1077, *f*). Skin, mounted, and skull. Same locality; collected by B. H. Hodgson, Esq.

*Transferred from India Museum*, 1879.

79. 11. 21. 667. Skin, young, mounted. Same locality and collector. *Same history.*

## II. Genus BABIRUSSA.

Babirussa, *Rafinesque, Analyse de Nature*, p. 56, 1815; *Lesson, Man. Mamm.* p. 337, 1827; *Gray, Hand-List Thick-skinned Mamm. Brit. Mus.* p. 67, 1873.

Babiroussus, *Gray, Med. Repos.* vol. xv, p. 306, 1821.

Babiroussa, *F. Cuvier, Dents Mamm.* p. 257, 1825.

Babyrussa, *Burnett, Quart. Journ. Sci. Lit.* vol. xxviii, p. 352, 1830.

Porcus, *Wagler, Nat. Syst. Amphib.* p. 17, 1830; *Stehlin, Abh. schweiz. pal. Ges.* vol. xxvii, Appendix, 1900.

Babirusa, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 162, 1842; *Deninger, Ber. nat. Ges. Freiburg*, vol. xviii, p. 1, 1910.

Dentition: $i.\ \frac{2}{3}$, $c.\ \frac{1}{1}$, $p.\ \frac{2}{2}$, $m.\ \frac{3}{3} = 34$; molars, especially the last, simpler than in *Sus;* canines (fig. 51) long, slender, recurved, growing from persistent pulps, and destitute of enamel, those of the upper jaw piercing the skin of the face some distance in advance of the eyes, and not wearing against the lower pair; in female canines quite small.

Young probably without stripes. The genus is regarded by Stehlin as related to *Sus verrucosus*.

The range is restricted to the islands of Boru and Celebes.

Deninger, who adopts Stehlin's theory of the "neobunodontism" of the molar teeth of the Suina (*supra*, p. 305), is of opinion that *Babirussa* is nearly related to the selenodont genus *Merycopotamus*, of the Indian Siwaliks; both genera agreeing in the parallelism of the two lines of cheek-teeth, the general contour and small size of these teeth, the form and direction of the tusks, and certain other features.

## BABIRUSSA BABYRUSSA.

Sus babyrussa, *Linn. Syst. Nat.* ed. 10, vol. i, p. 50, 1758, ed. 12, vol. i, p. 104, 1766; *Erxleben, Syst. Regn. Anim.* p. 188, 1777; *Desmarest, Mammalogie*, vol. ii, p. 391, 1822; *Griffith, Animal Kingdom*, vol. iii, p. 408, 1827; *Schinz, Natuges. Säugeth.* p. 247, 1824, *Synop. Mamm.* p. 352, 1845.

Aper orientalis, *Brisson, Regn. Anim.* p. 76, 1762.

Babirussa alfurus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 162, 1849.

Babirusa babirusa, *Deninger, Ber. nat. Ges. Freiburg*, vol. xviii, p. 4, 1910.

Babirusa orientalis, *Ward, Records of Big Game*, ed. 6, p. 461, 1910.

BABIRUSA.

Size relatively small and build slender; ears small and pointed; skin rugose and nearly bare, or smooth and hairy.

Typical locality Boru.

The two races are distinguished as follows :—

A. Skin smoother, skull shorter and broader..... *B. b. babyrussa.*

B. Skin rougher, skull longer and narrower ..... *B. b. celebensis.*

### A.—Babirussa babyrussa babyrussa.

Typical locality Boru (between Celebes and Ceram).

Skin comparatively smooth, clothed with short bristly hairs, thickest at root of tail; general colour whitish grey, tinged, especially on head, with yellow, female and young darker; skull short and broad, with tips of nasals not narrowed to a point between roots of canines.

60. 8. 27. 6 (718, *l*). Skull. Collected by Dr. A. R. Wallace, O.M.; entered in Gray's *Hand-List* as having been

obtained in Borneo, but probably the specimen mentioned in Wallace's *Malay Archepelago*, small ed. p. 299, as having been collected in Boru. *Purchased*, 1860.

## B.—Babirussa babyrussa celebensis.

Sus babirussa, *Quoy and Gaimard*, *Voyage Astrolabe*, *Zool.* vol. i, p. 125, pls. xxii and xviii, 1830; *F. Cuvier*, *Hist. Nat. Mamm.* vol. iv, pls. 300–302, 1842; *nec* Sus babyrussa, *Linn.*

Sus babirousa, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. v, p. 216, pl. xxiii, 1836.

Porcus babyrussa, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 301, 1844, vol. v, p. 509, 1855; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvii, Appendix, 1900.

Sus babyrussa, *Schinz*, *Synop. Mamm.* p. 352, 1845; nec *Linn.*

Babirussa alfurus, *Sclater*, *Proc. Zool. Soc.* 1860, p. 443, pl. lxxxiii; *Gray*, *ibid.* 1868, p. 42, *Cat. Carnivora*, *etc. Brit. Mus.* p. 349, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 67, 1873; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 356, 1884; nec *Lesson.*

Sus babirusa, *Guillemard*, *Cruise of "Marchesa,"* ed. 2, p. 326, 1889.

Babirusa alfurus, *Flower and Lydekker*, *Study of Mammals*, p. 287, 1891; *Lydekker*, *Horns and Hoofs*, p. 364, 1893; *Meyer*, *Abh. Zool. Mus. Dresden*, vol. vi. p. 15, 1897; *Sarasin*, *Celebes*, vol. iii, p. 108, 1901, vol. v, p. 37, 1905; *Beddard*, *Proc. Zool. Soc.* 1909, p. 172; nec *Lesson.*

Babirusa celebensis, *Deninger. Ber. Ges. nat. Freiburg*, vol. xviii, p. 7, 1910; *Lydekker*, *Ward's Records of Big Game*, ed. 7, p. 460, 1914.

Typical locality Celebes; the range includes some of the neighbouring islands.

Skin furrowed and wrinkled, nearly bare in adult; general colour brownish grey; skull narrow, with the tips of the nasals forming a sharp point between the bases of the canines.

60. 8. 27. 7 (718, *m*). Skull, immature. Collected by Dr. A. R. Wallace, O.M., probably in Celebes.
*Purchased*, 1860.

71. 5. 19. 7. Skin, mounted. Celebes.
*Purchased* (*Zoological Society*), 1871.

96. 6. 24. 2. Skin, mounted. Lipopang, Celebes; collected by Dr. C. Hose. *Purchased* (*Gerrard*), 1896.

0. 3. 30. 18. Skull. Same locality and collector.
*Purchased* (*Gerrard*), 1900.

0. 3. 30. 19. Skull. Same locality and collector.
*Same history.*

1. 10. 3. 1. Skull. Monano, Minahassa, Northern Celebes. *Presented by N. Samwell, Esq.*, 1901.

9. 11. 30. 1. Skull. Soemalta, northern coast of Celebes.
*Presented by A. S. Williams, Esq.*, 1909.

9. 11. 30. 2. Skull, wanting tusks. Same locality.
*Same history.*

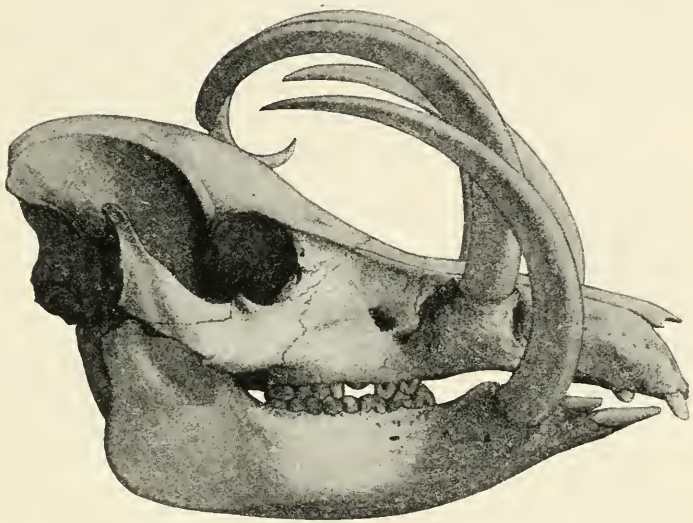


Fig. 51.—Skull of Babirusa (*Babirussa babyrussa celebensis*).
From Gray, *Hand-List of Thick-skinned Mammals.*

Of the following specimens the localities are not definitely known, so that they may possibly include representatives of the preceding as well as of the present race:—

718, *a*. Skull. *No history.*

718, *j*. Skull. *No history.*

718, *i*. Skeleton. *Purchased* (*Zoological Society*).

38. 4. 16. 32 (718, *b*). Skull. *Purchased* (*Stevens*), 1838.

46. 3. 13. 3 (718, *d*). Skull (fig. 51). Figured in Gray's *Hand-List*, pl. xxvii, fig. 2 *Purchased* (*Argent*), 1846.

48. 12. 6. 1 (718, *e*). Skull. *Purchased* (*Stevens*), 1848.

51. 10. 23. 1 (718, *g*). Skull.
*Presented by G. Daniels, Esq.*, 1851.

58. 5. 4. 43 (718, *h*). Skull.
*Purchased* (*Zoological Society*), 1858.

59. 8. 16. 4 (718, *k*). Skull. "Borneo" = (?) Boru.
*Purchased* (*Wright*), 1859.

67. 4. 12. 209. Skull, young. Figured in Gray's *Hand-List*, pl. xxvii, fig. 1.
*Lidth de Jeude Collection, purchased*, 1867.

67. 4. 12. 221 (718, *o*). Skull. *Same history.*

67. 4. 12. 222 (718, *p*). Skull. *Same history.*

67. 4. 12. 223 (718, *q*). Skull. Figured in Seba's *Thesaurus*, vol. i, pl. ii, fig. 3, 1734. *Same history.*

## III. Genus POTAMOCHŒRUS.

Koiropotamus, *Gray*, *List Mamm. Brit. Mus.* p. xxvii, 1843, nomen nudum.

Choiropotamus, *Gray*, *List. Mamm. Brit. Mus.* p. 185, 1843, *Ann. Mag. Nat. Hist.* ser. 2, vol. x, p. 282, 1852; *nec* Chœropotamus, *Cuvier*, 1822.

Potamochœrus, *Gray*, *Proc. Zool. Soc.* 1852, p. 129, 1854, *Ann. Mag. Nat. Hist.* ser. 2, vol. xv, p. 65, 1855, ser. 4, vol. xi, p. 434, 1873, *Cat. Carnivora, etc. Brit. Mus.* p. 340, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 56, 1873; *Major*, *Proc. Zool. Soc.* 1897, p. 359; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 70, 1899; *W. L. Sclater*, *Fauna S. Africa*, *Mamm.* vol. i, p. 273, 1900.

Nyctochœrus, *Heuglin*, *Nova Acta Ac. Cæs. Leop.-Car.* vol. xxx, Nachtrag 2, p. 7, 1863.

Dentition: $i.\frac{3}{3}$, $c.\frac{1}{1}$, $p.\frac{4}{3}$, $m.\frac{3}{3} = 42$; teeth of the same general character as in *Sus*, but the canines (the summits of the upper pair of which are completely abraded by the lower ones) smaller and the molars of a relatively simple type, with thick enamel; in adult male skulls (fig. 52) a bony tuberosity or ridge above the root of the upper canine and a second on the sheath of the same, the upper ridge in aged individuals developing a horny capsule; ears with terminal tufts of long hairs; coat more abundant, less bristly, and frequently much more brightly coloured than in *Sus*. Young striped.

The thickness of the enamel of the molars, coupled with their simple structure, suggests affinity with *Sus celebensis* and *S. verrucosus*.

At the present day the genus is restricted to Ethiopian Africa and Madagascar, but Stehlin is of opinion that certain large swine from the lower Pliocene of Attica and India, originally described as *Sus crymanthius*, *S. giganteus*, and *S. titan*, really belong to *Potamochœrus*.

The following is a "key" to the species:—

A. Coat long, sparse, and more or less dark in adult; dorsal crest long and mainly black; facial tuberosities strongly developed.
  *a*. Parietal region of upper surface of skull shorter.
    *a'*. Muzzle more slender (?)..... *P. larvatus*.
    *b'*. Muzzle less slender (?)..... *P. chœropotamus*.
  *b*. Parietal region of upper surface of skull longer *P. hassama*.

B. Coat and facial tuberosities as in A; colour and colour-pattern as in B..... *P. intermedius*.

C. Coat shorter, denser, and more or less rufous; dorsal crest short and white; facial tuberosities less developed than in A..... *P. porcus*.

## I. POTAMOCHŒRUS LARVATUS.

Sus larvatus, *F. Cuvier*, *Mém. Mus. Paris*, vol. viii, p. 447, pl. xxii, 1822.

Phascochœrus larvatus, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. v, p. 232, 1836, partim.

Choiropotamus africanus, *Gray*, *List Mamm. Brit. Mus.* p. 185, 1843, partim.

Potamochœrus africanus, *Gray*, *Proc. Zool. Soc.* 1852, p. 131, 1854, 1868, p. 34, *Cat. Carnivora, etc. Brit. Mus.* p. 341, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 56, 1873, partim.

Potamochœrus madagascariensis, *Grandidier*, *Rev. Mag. Zool.* 1867, p. 85.

Potamochœrus edwardsi, *Grandidier*, *Rev. Mag. Zool.* 1867, p. 318; *Gray*, *Ann. Mag. Nat. Hist.* ser. 4, vol. xv, p. 45, 1875; *Sclater*, *Proc. Zool. Soc.* 1894, p. 92.

Potamochœrus larvatus, *Major*, *Proc. Zool. Soc.* 1897, p. 363, pls. xxv and xxvi, fig. 2; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 17, pl. x, 1899; *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902, *Proc. Zool. Soc.* 1906, p. 632; *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 28, 1910.

Macrocephalus larvatus, *Elliot*, *Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 34, 1907.

Typical locality Western Madagascar; the range also including the eastern districts of that island.

Chiefly distinguished from the next, and typical, species by its smaller size, and, it is said, the more slender muzzle.

The alleged absence of flattening and lateral angulation in the nasal region, and the massiveness and simple character of the premolars, do not appear to be constant characters. Coloration almost indistinguishable from that of some of the eastern representatives of the next species.

As the name *larvatus* antedates *chœropotamus*, the former must stand if the insular and continental forms are regarded as specifically inseparable.

The two Malagasy races are chiefly distinguished by size.

### A.—Potamochœrus larvatus larvatus.

Typical (and only) locality Western Madagascar.

Size relatively small, with the flat portion of parietal region of skull narrow (16 mm.).

No specimen in the collection.

### B.—Potamochœrus larvatus hova.

Potamochœrus larvatus hova, *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 32, 1910.

Typical (and only) locality Eastern Madagascar.

Larger than typical race, with the facial profile still straighter, and the parietal region wider (26 to 40 mm.).

74. 3. 11. 1 (1659, *a*). Skin, mounted, and skull, young. Ambodiague, west of Antananarivo; collected by Mr. E. Bartlett. *Purchased*, 1874.

74. 10. 9. 1 (1659, *b*). Skull. Tamatave Forest; collected by Mr. A. Crossley. Figured by Gray, *Ann. Mag. Nat. Hist. op. cit.* pl. iv. *Purchased*, 1874.

97. 9. 1. 162. Skull and skin. Ampitambe, Eastern Madagascar; collected by Dr. C. J. Forsyth Major. Type. *Purchased*, 1897.

8. 3. 25. 1. Skin, mounted. Madagascar. *Purchased*, 1908.

## II. POTAMOCHŒRUS CHŒROPOTAMUS.

Sus africanus, *Gmelin*, *Linn.'s Syst. Nat.* vol. i, p. 220, 1788; *Schreber*, *Säugthiere*, vol. i, p. 327, 1791; *Thunberg*, *Mém. Ac. Sci. St. Pétersb.* vol. iii, p. 320, 1811; *Blainville*, *Ostéographie*, *Sus*, pl. viii, fig. 1, partim; *Flower and Lydekker*, *Study of*

*Mammals*, p. 286, 1891; *Lydekker*, *Horns and Hoofs*, p. 362, 1893.

Sus koiropotamus, *Desmoulins*, *Dict. Class. Hist. Nat.* vol. xvii, p. 139, pl. cxxxix, fig. 2, 1831.

Phascochœrus chocropotamus, *Lesson*, *Nouv. Tabl. Règne Anim.*, *Mamm.* p. 162, 1842.

Potamochœrus africanus, *Gray*, *Proc. Zool. Soc.* 1852, p. 131, 1854, 1858, p. 58, pl. lix, 1860, p. 443, 1868, p. 34, *Cat. Carnivora, etc. Brit. Mus.* p. 341, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 56, 1873; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 355, 1884; *Bocage*, *Journ. Sci. Lisboa*, 1890, p. 29; *Matschie*, *Säugeth. Deutsch-Ost-Afrika*, p. 101, 1895.

Sus capensis, *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 277, 1862, nomen nudum.

Potamochœrus chœropotamus, *Major*, *Proc. Zool. Soc.* 1897, p. 366; *W. L. Sclater*, *Fauna S. Africa*, *Mamm.* vol. i, p. 274, 1900; *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902, *Proc. Zool. Soc.* 1906, p. 632; *Lydekker*, *Game Animals of Africa*, p. 391, 1908; *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 14, 1910; *Cabrera*, *Cat. Met. Mam. Mus. Madrid*, p. 133, 1912; *Ward*, *Records of Big Game*, ed. 6, p. 456, ed. 7, p. 455, 1914.

Sus chœropotamus, *Lydekker*, *Great and Small Game of Africa*, p. 523, 1899.

Sus larvatus, *Nicolls and Eglington*, *Sportsman in S. Africa*, p. 78, 1892..

Potamochœrus capensis, *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902.

Potamochœrus koiropotamus, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xxxiii, p. 339, 1914.

Bosch-Vark; Bush-Pig.

Typical locality probably South Africa.

The type species.

Larger than *P. larvatus*, to which it is in other respects very similar; typically the coat long, and intermingled with elongated bristles, between which the skin is frequently visible; dorsal crest strongly developed, often extending forward to ears, its constituent bristles dark brown or blackish, with more or less conspicuous white tips; ears, inclusive of margins and tufts, black externally; forehead generally grey; a broad blackish ring on muzzle in advance of the tuberosities; general colour variable, but frequently dark grey or blackish; in old males the facial tuberosities strongly developed (fig. 52), the upper ones forming a pair of convex crests elevated considerably above the nasal plane, and the second pair reaching that plane; postorbital portion of skull relatively short.

The range includes Southern, Central, and Eastern Africa as far north as Kenia, British East Africa.

Fig. 52.—Skull of Southern Bush-Pig (*Potamochœrus chœropotamus*).
From Gray, *Hand-List of Thick-skinned Mammals.*

The following is a provisional "key" to the species:—

A. Eyes not ringed with black.
  *a*. Parietal region of skull broad (39 to 44 mm. or more).
    *a'*. Muzzle with a black ring..... *P. c. chœropotamus.*
    *b'*. Muzzle wholly black..... *P. c. johnstoni.*
  *b*. Parietal region of medium width (24 to 26 mm.)..... *P. c. maschona.*
  *c*. Parietal region very narrow (15 to 18 mm.).
    *c'*. Colour very dark, largely black, black and rufous when immature..... *P. c. dæmonis.*
    *d'*. Colour less dark, mingled black and rufous, mainly rufous when immature... *P. c. nyasæ.*
B. Eyes with black rings..... *P. c. keniæ.*

## A.—Potamochœrus chœropotamus chœropotamus.

Sus chœropotamus typicus, *Lydekker, Great and Small Game of Africa*, p. 523, 1899.

Typical locality South (?) Africa.

Colour variable, but very generally dark grey; parietal region of skull relatively broad, the width in adults reaching as much as 42 or even 47 mm.

38. 4. 16. 81 (715, *a*). Skull, female. Damaraland;

collected by Capt. Sir J. E. Alexander. Type of "*Sus capensis*." *Purchased*, 1838.

40. 6. 24. 5. Skin, mounted. Cape Colony.
*Purchased* (*Dr. Krauss*), 1840.

40. 6. 24. 6. A similar specimen. Same locality.
*Same history.*

40. 6. 24. 7. Skin, young, mounted. Same locality.
*Same history.*

43. 12. 7. 20. Skin, young. Cape Colony.
*Purchased* (*Verreaux*), 1843.

51. 5. 5. 3 (1364, *a*). Skull (fig. 52). South Africa. Figured in Gray's *Hand-List*, pl. xxiii, fig. 2.
*Purchased* (*Argent*), 1851.

62. 3. 30. 3 (1364, *b*). Skeleton (diseased). Probably South Africa. *Purchased* (*Zoological Society*), 1862.

67. 4. 12. 220 (1364, *c*). Skull. Probably South Africa. Noticed by Lönnberg, *op. cit.* p. 16.
*Lidth de Jeude Collection, purchased*, 1867.

10. 6. 17. 3. Skull. South Africa.
*Presented by O. Thomas, Esq.*, 1910.

## B.—Potamochœrus chœropotamus maschona.

Potamochœrus chœropotamus maschona, *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 20, 1910; *Lydekker*, *Game Animals of Africa*, *Suppl.* p. 21, 1911.

Typical locality Coguno, Mashonaland (west of Lake Nyasa); the range includes Portuguese East Africa.

General colour as dark as in typical race, being frequently rufous brown, more or less intermixed with blackish or black, but parietal region of skull narrower (24 to 26 mm.); dorsal crest strongly tipped with white.

3. 6. 4. 2. Skull. Mazoe, Mashonaland, N. E. Rhodesia. Noticed by Lönnberg, *op. cit.* p. 16.
*Presented by J. ff. Darling, Esq.*, 1903.

6. 11. 8. 135. Skull, imperfect, and skin. Coguno, Inhambane, Mashonaland. Noticed by Lönnberg, *op. cit.* p. 21; may be regarded as the type; collected by Mr. C. H. B. Grant. *Presented by C. D. Rudd, Esq.*, 1906.

9. 12. 4. 91. Skull, imperfect, and skin, immature

female. Mperokosa, Northern Rhodesia; collected by S. A. Neave, Esq. Noticed by Lönnberg, *loc. cit.* *Purchased*, 1909.

7. 10. 25. 3. Skull, very old boar. Portuguese East Africa, probably Beira. Noticed by Lönnberg, *op. cit.* p. 16. *Presented by F. V. Kirby, Esq.*, 1907.

## C.—Potamochœrus chœropotamus dæmonis.

Potamochœrus chœropotamus dæmonis, *Major*, *Proc. Zool. Soc.* 1897, p. 367, pls. xxv, fig. 1, and xxvi, fig. 3; *Rothschild*, *ibid.* 1906, p. 632; *Lydekker*, *Game Animals of Africa*, p. 397, 1908; *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 26, 1910.

Potamochœrus dæmonis, *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902.

Potamochœrus koiropotamus dæmonis, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xxxiii, p. 339, 1914.

Typical locality Kilimanjaro, East Africa.

Smaller than the last, and darker than any of the other races, adults being deep black, and immature individuals mingled black and rufous, the rufous predominating on the back and forehead, and black on sides of neck, chest, and limbs; flat portion of parietal region narrow (about 18 mm.).

94. 4. 24. 4. Skull and skin, female. Kilimanjaro; collected by Rev. W. Morris. Type. Noticed by Lönnberg, *op. cit.* p. 16, where a Berlin specimen is stated to be the type. *Purchased*, 1892.

## D.—Potamochœrus chœropotamus nyasæ.

Potamochœrus chœropotamus nyasæ, *Major*, *Proc. Zool. Soc.* 1897, p. 367, pls. xxv, fig. 3, and xxvi, fig. 1; *Thomas*, *ibid.* p. 938; *Lydekker*, *Game Animals of Africa*, p. 392, 1908; *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 24, 1910; *Ward*, *Records of Big Game*, ed. 6, p. 456, 1910.

Sus chœropotamus nyasæ, *Lydekker*, *Great and Small Game of Africa*, p. 523, 1899.

Potamochœrus nyasæ, *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902.

Typical locality Nyasaland.

General colour of adult very dark; muzzle and fore part of neck wholly black; forehead dirty grey mixed with black, and a black eyebrow-stripe; dorsal crest commencing behind ears, where it is much mingled with white; back and sides mingled rufous and black, the rufous predominating on the

former; tail buffish grey, with black tuft. In immature individuals the rufous much more predominant. Flat portion of parietal region of skull very narrow (about 15 mm.).

93. 5. 2. 43–44. Two skins, young. Zomba, Nyasaland; collected by A. Whyte, Esq. *Presented by Sir H. H. Johnston, G.C.M.G., K.C.B.*, 1893.

93. 5. 6. 4. Skin, mounted, and skull. Same locality and collector. *Same history.*

93. 7. 25. 12. Skull, female. Near Lake Mweru, N. E. Rhodesia; same collector. *Same history.*

94. 3. 8. 19. Skull. Same locality; collected by Sir A. Sharpe, K.C.M.G., C.B. This and the preceding specimen are provisionally identified by Major, *op. cit.* p. 366, with the race represented by the undermentioned skins; the present skull being figured in pls. xxv, fig. 4, and xxvi, fig. 4 (wrongly numbered 94. 3. 18. 9). Both skulls are also noticed by Lönnberg, *op. cit.* p. 16, under different racial headings; no. 94. 3. 8. 19 being regarded as the type of the present race, which, according to Major's somewhat confused account, it is certainly not. *Same donor*, 1894.

94. 6. 7. 9–10. Two skins, one immature. Zomba and Mpimbi; collected by A. Whyte, Esq. These and one of the preceding Nyasa skins must be regarded as the co-types. *Same history.*

97. 1. 12. 4. Skin, female, mounted. Nyasaland; same collector. *Same donor*, 1907.

97. 10. 1. 260–262. Three skins. Zomba; same collector. *Same history.*

98. 6. 23. 1. Skull. Zomba. Noticed by Lönnberg, *op. cit.* p. 16. *Presented by Sir Alfred Sharpe, K.C.M.G., C.B.*, 1898.

7. 9. 17. 7. Skin, mounted. Southern Nyasaland, *By exchange*, 1907.

## E.—Potamochœrus chœropotamus johnstoni.

Potamochœrus johnstoni, *Major*, *Proc. Zool. Soc.* 1897, p. 367, pls. xxv, fig. 3, and xxvi, fig. 1; *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902, *Proc. Zool. Soc.* 1906, p. 632; *Lydekker*, *Game Animals of Africa*, p. 395, 1908.

Potamochœrus chœropotomus johnstoni, *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 22, 1910; *Lydekker*, *Game Animals of Africa*, *Suppl.* p. 21, 1911.

Typical locality Ngaravi Valley, N. W. Nyasaland.

Size rather larger than in *P. c. nyasæ;* general colour very similar to that of typical race, but the muzzle, except for a whitish spot on each side, wholly black, as are the limbs, tail-tuft, and a patch on the cheeks; back, on each side of the white-tipped dorsal crest, yellowish brown, darkening, through brown, to black on flanks; parietal region of skull very broad (44 mm.).

91. 5. 9. 5. Skull, female. Ngaravi Valley, N. W. Nyasaland. Type. Noticed by Lönnberg, *op. cit.* p. 16. *Presented by Sir H. H. Johnston, G.C.M.G., K.C.B.*, 1891.

7. 2. 14. 1. Skull and mounted skin, referred to this race by Lönnberg (*op. cit.* pp. 16 and 22). Fort Manning, N. E. Rhodesia. *Purchased (Ward)*, 1907.

## F.—Potamochœrus chœropotamus keniæ.

Potamochœrus chœropotamus keniæ, *Lönnberg, Ann. Mag. Nat. Hist.* ser. 8, vol. ix, p. 66, 1912, *K. Svenska Vet.-Ak. Handl.* vol. xlviii, no. 5, p. 132, 1912.

Typical locality forests near Nairobi, B. E. Africa.

Type in Royal Swedish Museum, Stockholm.

Face white, with the ears, a patch round eyes, and a streak above whiskers black; dorsal crest from behind ears to middle of back black with long white tips, and similar bristles on loins; sides of back rich rufous mingled with black; flanks, sides of neck, under-parts, and limbs black.

4. 11. 5. 17. Skull, imperfect, and wanting lower jaw. Kenia district, B. E. Africa. *Presented by Capt. R. Meinertzhagen*, 1904.

12. 7. 2. 9. Skull and skin, female. Kidori, Tana Valley, B. E. Africa. *Presented by G. Blaine, Esq.*, 1912.

12. 7. 28. 1. Skin. Mau Forest, above Njoro, B. E. Africa. *Presented by C. W. Woodhouse, Esq.*, 1912.

13. 3. 19. 11. Skeleton and skin, old boar. Umbagasi Valley, B. E. Africa. *Presented by the East Africa and Uganda Natural History Society*, 1913.

## III. POTAMOCHŒRUS HASSAMA.

Nyctochœrus hassama, *Heuglin*, *Nova Acta. Ac. Cæs. Leop.-Car.* vol. xxx, Nachtrag 2, p. 7, 1863, *Reise Nord-Ost Afrika*, pp. 97 and 277, 1877; *Nehring*, *Zool. Garten*, vol. xxxvi, p. 50, 1895.

Potamochœrus hassama, *Major*, *Proc. Zoc. Soc.* 1897, p. 368; *Rothschild*, *Powell-Cotton's Abyssinia*, p. 481, 1902; *Lydekker*, *Game Animals of Africa*, p. 395, 1908; *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 37, 1910.

Sus chœropotamus hassama, *Lydekker*, *Great and Small Game of Africa*, p. 523, 1899.

Assami.

Type of *Nyctochœrus*.

Typical locality Abyssinia.

Type in Senckenberg Museum, Frankfurt-am-Main.

Apparently allied in external characters, as well as in the development of the facial tuberosities, to *P. chœropotamus*, but the parietal region—of which the flat portion is comparatively narrow, although rather less so than in *P. c. nyasæ*—much longer, both actually, and relatively to the rest of the skull.

No specimen in collection.

## IV. POTAMOCHŒRUS PORCUS.

Sus porcus, *Linn.*, *Syst. Nat.* ed. 10, vol. i, p. 50, 1759, ed. 12, vol. i, p. 103, 1766; *Flower and Lydekker*, *Study of Mammals*, p. 286, 1891; *Lydekker*, *Horns and Hoofs*, p. 363, 1893; *Bryden*, *Great and Small Game of Africa*, p. 531, 1899.

Sus penicillatus, *Schinz*, *Monogr. Säugeth.* pt. x, p. 12, 1848, *Rev. Zool.* 1848, p. 152.

Potamochœrus penicillatus, *Gray*, *Proc. Zool. Soc.* 1852, p. 131, pl. xxxiv, 1854, 1858, p. 58; *Selater*, *ibid.* 1861, p. 62, pl. xii; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 279, 1862; *Noack*, *Zool. Jahrb.*, *Syst.* vol. ii, p. 197, 1887; *Pousargues*, *Ann. Sci. Nat.*, *Zool.* vol. iv, p. 90, 1896; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 71, 1899.

Potamochœrus porcus, *Gray*, *Proc. Zool. Soc.* 1860, p. 36, *Cat. Carnivora, etc. Brit. Mus.* p. 349, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 56, 1897, *Ann. Mag. Nat. Hist.* ser. 4, vol. xv, p. 45, 1875; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 356, 1884; *Major*, *Proc. Zool. Soc.* 1897, pp. 363 and 369; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvii, pl. x, fig. 7, 1900; *Lydekker*, *Game Animals of Africa*, p. 396, 1908; *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 3, 1910; *Ward*, *Records of Big Game*, ed. 6, p. 456, 1910, ed. 7, p. 455, 1914.

Sus chœropotamus porcus, *Lydekker*, *Great and Small Game of Africa*, p. 523, 1899.

Red River-Hog.

Typical locality West Africa.

Compared with *P. chœropotamus*, the coat is shorter and denser, so that no portion of the skin is visible; dorsal crest short, white, and conspicuous, commencing, as a rule, a little behind the ears; general colour typically reddish brown or rufous, but in adults the upper portion of the forehead, between the eyes and ears, black, whitish in one race; ears black with more or less of the upper portion of the margins of part of the tufts whitish; in immature individuals the forehead, except for the admixture of black hairs, coloured like body; facial tuberosities generally much less developed than in typical species, the upper pair not projecting above nasal plane (fig. 53).

The range extends from the Gabun, Cameruns, and adjacent districts to the Belgian Congo.

The following is a tentative "key" to the local races:—

A. Facial tuberosities of skull, when known, not projecting above nasal plane.
  *a*. Forehead and muzzle black.
    *a'*. Parietal region narrower (42–47 mm.) ..... *P. p. porcus.*
    *b'*. Parietal region wider (49–58 mm.) ..... *P. p. pictus.*
  *b*. Either muzzle or forehead whitish.
    *b'*. Size smaller, muzzle whitish..... *P. p. ubangensis.*
    *c'*. Size larger, forehead whitish..... *P. p. albifrons.*

B. Facial tuberosities of skull projecting slightly above nasal plane, and upper one of each side connected with the lower one by a bony arch... *P. p. congicus.**

## A.—Potamochœrus porcus porcus.

Typical locality Upper Guinea.

General characters those of the species; flat portion of parietal region moderately wide (about 42–47 mm.); muzzle black.

64. 7. 16. 2 (715, *b*). Skull, female. West Africa; collected by Mr. Dalton. *Purchased*, 1864.

65. 5. 3. 3 (715, *c*). Skull. Niger Valley; collected by Dr. W. B. Baikie. Noticed by Lönnberg, *op. cit.* p. 8. *Purchased*, 1865.

* Possibly identical with *albifrons*.

65. 5. 3. 4 (715, *d*). Skull. Same locality and collector. Noticed by Lönnberg, *loc. cit.* *Same history.*

71. 5. 27. 6 (1363, *e*). Skull and skin. Gabun. Noticed by Lönnberg, *loc. cit.* *Presented by Monsieur P. B. du Chaillu*, 1871.

71. 5. 27. 6* (1363, *f*). Skull and skin, immature. Same locality. *Same history.*

12. 6. 20. 12. Skull and skin, very young. Bibianaha, Gold Coast. *Presented by Dr. H. G. F. Spurrell*, 1912.

## B.—Potamochœrus porcus pictus.

Choiropotamus pictus, *Gray, Ann. Mag. Nat. Hist.* ser. 2, vol. x, p. 281, 1852.

Potamochœrus porcus pictus, *Lönnberg, Arkiv Zool.* vol. vii, no. 6, p. 7, 1910; *Lydekker, Game Animals of Africa, Suppl.* p. 2, 1911.

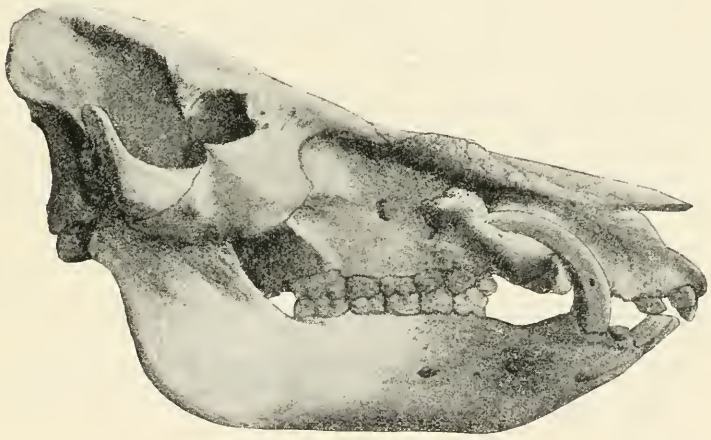


Fig. 53.—Skull of Camerun Bush-Pig, or Red River-Hog (*Potamochœrus porcus pictus*).

From Gray, *Hand-List of Thick-skinned Mammals.*

Typical locality Cameruns, W. Africa.

Flat portion of parietal region wider than in typical race (49–58 mm.); muzzle black.

56. 12. 30. 7. Skin, young. From an animal born in London Zoological Gardens.

*Purchased* (*Zoological Society*), 1856.

57. 3. 5. 2. Skin, young. This and the next specimen were from the offspring of the animals represented by numbers 60. 7. 22. 9 and 61. 1. 18. 7.

*Purchased* (*Bartlett*), 1857.

57. 8. 3. 1. Skin, young. *Vide* No. 57. 3. 5. 2.

*Purchased* (*Zoological Society*), 1857.

60. 7. 22. 9–10 (1363, *a*). Skin, mounted, and skeleton. Cameruns. Type. Skull (fig. 53) figured in Gray's *Hand-List*, pl. xxiii, fig. 1. The animal lived in the London Zoological Gardens from 1852 to 1860.

*Purchased* (*Zoological Society*), 1860.

61. 1. 18. 7. Skeleton, female. Cameruns.

*Purchased* (*Zoological Society*), 1861.

67. 10. 5. 2. Skin, young, mounted. Menagerie-born.

*Purchased* (*Zoological Society*), 1867.

94. 7. 25. 1–2. Two skulls. Benin, Nigeria.

*Presented by R. Millson, Esq.*, 1894.

4. 10. 12. 9. Skin, immature, mounted. Cameruns.

*Purchased*, 1904.

6. 5. 25. 1. Skin, immature, mounted. Cameruns.

*Purchased* (*Ward*), 1906.

12. 10. 22. 76. Skull, immature. Oban district, Southern Nigeria. *Presented by P. A. Talbot, Esq.*, 1912.

### C.—Potamochœrus porcus ubangensis.

Potamochœrus porcus, *Alexander*, *From Niger to Nile*, vol. ii, p. 394, 1907.

Potamochœrus porcus ubangensis, *Lönnberg*, *Arkiv Zool.* vol. vii, no. 6, p. 10, 1910; *Lydekker*, *Game Animals of Africa*, *Suppl.* p. 21, 1911.

Typical locality Ubangui Valley, northern Belgian Congo.

Smaller than the other races, with the flat portion of the parietal region of the skull much narrower (26 mm.), and the whole muzzle whitish.

7. 7. 8. 258. Skull and head-skin. Ubangui Valley. Type. *Presented by the Alexander-Gosling Expedition*, 1907.

### D.—Potamochœrus porcus albifrons.

Potamochœrus albifrons, *du Chaillu, Boston Journ. Nat. Hist.* 1860, p. 301, *Adventures in Equatorial Africa*, p. 422, pl. lxii, 1861.
Potamochœrus porcus albifrons, *Lönnberg, Arkiv Zool.* vol. vii, no. 6, p. 11, 1910.

Typical locality near Cape Lopez, western French Congo.

Type probably in the Boston Museum, U.S.A.

Larger than the preceding race, with the muzzle black; forehead mainly white, except for a triangular black area between the ears ending in a point about three inches below the line of the eyes; skull-characters unknown.

No specimen in collection.

### E.—Potamochœrus porcus congicus.

Potamochœrus porcus congicus, *Lönnberg, Arkiv Zool.* vol. vii, no. 6, p. 14, 1910.

Typical locality Lower Congo.

Type in Royal Swedish Museum of Natural History, Stockholm.

A provisional race, founded on the skull, which is much larger than that of *P. p. ubangensis*, with the flat portion of the parietal area narrow (31·5 mm.), and the facial tuberosities more developed than in any other race, the upper ones projecting slightly above the nasal plane, and being connected in old males by a bony arch on each side with the lower pair; nasal region wider than in *P. p. pictus*.

Whether this type of skull is really distinct from that of *P. p. albifrons* has still to be proved.

No specimen in collection.

## V. POTAMOCHŒRUS INTERMEDIUS.

Potamochœrus intermedius, *Lönnberg, Arkiv Zool.* vol. vii, pt. 6, p. 38, 1910; *Lydekker, Game Animals of Africa, Suppl.* p. 21, 1911; *Schouteden, Rev. Zool. Africaine*, vol. ii, p. 138, 1912.

Typical locality Ruwenzori district, Upper White Nile, Uganda.

Intermediate in general characters between *P. chœropotamus* and *P. porcus*, and therefore suggestive that all the forms of bush-pig are no more than local races of the Malagasy *P. larvatus*. Schouteden considers this bush-pig to be

much nearer to *P. chœropotamus* than to *P. porcus*. Coat long and coarse and dorsal crest long and parti-coloured, as in the former, but general colour and colour-pattern like those of the latter.

6. 7. 1. 188. Skull, immature, referred by Lönnberg, *op. cit.* p. 16, to this species. Eastern Ruwenzori; collected by R. E. Dent, Esq.

*Presented by the Ruwenzori Expedition*, 1906.

6. 7. 1. 189. Skull, half-grown female. Same locality and collector. *Same history.*

6. 12. 4. 71. Skull, old boar. Same locality; noticed by Lönnberg, *op. cit.* *Same history.*

7. 12. 18. 1. Skin. Upper White Nile, Uganda, 4000 feet; collected by R. J. Cuninghame, Esq. *Purchased*, 1907.

## IV. Genus HYLOCHŒRUS.

Hylochœrus, *Thomas*, *Nature*, vol. lxx, p. 577, 1904, *Proc. Zool. Soc.* 1904, vol. ii, p. 193.

To a considerable extent intermediate between *Potamochœrus* and *Phacochœrus*, the molars being of the brachyodont type of those of the former, while the upper canines are abraded in the fashion characteristic of the latter, and there is but one pair of upper incisors; the skull conforms in general features to the *Sus* and *Potamochœrus* type, although in its depressed form and the markedly lower occipital region it foreshadows that of *Phacochœrus*.

Dentition: $i.\frac{1}{2-3}$, $c.\frac{1}{1}$, $p.\frac{3}{2}$, $m.\frac{3}{3} = 32$ or 34; outer lower incisors frequently shed early, and in some instances perhaps never developed; upper canines of males very large and thick, with facets worn on their lower surfaces by the attrition of the lower pair, so that their summits remain more or less nearly entire; last molars in each jaw brachyodont and normal in structure; face with a pair of large fungus-like warty growths below the eyes; ears relatively small and not distinctly tufted; terminal disc of muzzle relatively large; coat very coarse, sparse, and uniformly dark-coloured; prenasal ossicle welded to nasals; occipital surface of skull broader and lower than in *Potamochœrus;* forehead wide and

concave, and sides of nasal region sloping evenly outwards, as in the next, without the sharp lateral angulation of the nasals found in *Potamochœrus* and *Sus*. Coloration of young apparently unknown.

The distributional area is probably co-extensive with the great forest-tract of equatorial Africa, in which it is known to extend from the Cameruns in the west, to the Ituri and Semliki Valleys in the east, while northwards it reaches southern Abyssinia.

## HYLOCHŒRUS MEINERTZHAGENI.

Hylochœrus meinertzhageni, *Thomas*, *Nature*, vol. lxx, p. 577, 1904, *Proc. Zool. Soc.* 1904, vol. ii, p. 193; *Rothschild*, *Proc. Zool. Soc.* 1906, p. 632; *M. Rothschild and Neuville*, *Bull. Soc. Philom.* ser. 9, vol. viii, p. 141, pls. i–xi, 1906; *Lydekker*, *Game Animals of Africa*, p. 396, 1908, *Suppl.* p. 22, 1911, *Field*, vol. cxxi, p. 488, 1913; *Allen*, *Proc. Biol. Soc. Washington*, vol. xxiii, p. 49, 1909; *Ward*, *Records of Big Game*, ed. 6, p. 457, 1910, ed. 7, p. 456, 1914; *Lönnberg*, *K. Svenska Vet.-Ak. Handl.* vol. xlviii, no. 5, p. 136, 1912.

(?) Hylochœrus ituriensis, *Matschie*, *Ann. Mus. Congo*, *Zool.* ser. 5, vol. i, p. 9, pls. i–v, 1906.

(?) Hylochœrus meinertzhageni ituriensis, *Lydekker*, *Game Animals of Africa*, p. 398, 1908, *Suppl.* p. 24, 1911; *Allen*, *Proc. Biol. Soc. Washington*, vol. xxiii, p. 49, 1909.

(?) Hylochœrus gigliolii, *Balducci*, *Publ. R. Prim. Stud. Super. Firenze*, 1909, p. 1.

Typical locality the Kenia district of British East Africa: the range co-extensive with that of the genus.

Size very large, build heavy, and limbs relatively long; coat long, coarse, and wholly black, becoming sparse in old age; skin blackish grey.

The external characters by which *H. ituriensis*, from the Ituri Valley (with which *H. gigliolii*, from the Upper Congo, is almost certainly inseparable), is stated to be distinguished appear to be mainly features of immaturity; the undermentioned skull from the Semliki does not appear to be racially separable from that of the type.

The two races here recognised are distinguishable as follows:—

A. Molars broad, with much cement..... *H. m. meinertzhageni.*
B. Molars narrower, with less cement..... *H. m. rimator.*

### A.—Hylochœrus meinertzhageni meinertzhageni.

Typical locality the Kenia district of British East Africa: the range extends northwards to Abyssinia.

Cheek-teeth broad and heavy, with a large development of cement in the valleys.

4. 11. 5. 14. Skull and portion of skin. Nandi Forest, B. E. Africa. Type.
*Presented by Capt. R. Meinertzhagen*, 1904.

4. 11. 5. 15. Hind half of skull, wanting lower jaw, female. Same locality. *Same history.*

5. 5. 16. 1. Skeleton and skin, immature female. Nyeri, B. E. Africa. *Presented by C. W. Haywood, Esq.*, 1905.

5. 10. 21. 1. Skull, Semliki Forest. Probably represents *H. ituriensis*. *Presented by Lieut.-Col. J. J. Harrison*, 1905.

5. 10. 21. 2. Skull. Same locality. *Same history.*

7. 1. 12. 1. Skull, immature, wanting lower jaw. B. E. Africa. *Presented by C. W. Haywood, Esq.*, 1905.

12. 7. 28. 9–10. Two skins. Mau Forest, above Njoro, B. E. Africa. *Presented by C. W. Woodhouse, Esq.*, 1912.

12. 7. 28. 11. Skull, imperfect, and skin, female. Same locality. *Same history.*

12. 7. 28. 12. Skin. Laikipia Escarpment, B. E. Africa. *Same history.*

12. 7. 28. 13–14. Two skulls and skins, young. Same locality. *Same history.*

12. 7. 28. 15. Skin, mounted, and skull. Mau Forest. *Same history.*

13. 3. 2. 6. Fore part of skull. Salle Forest, Mount Goré, Abyssinia. *Presented by S. C. G. Clarke, Esq.*, 1913.

### B.—Hylochœrus meinertzhageni rimator.

Hylochœrus rimator, *Thomas, Proc. Zool. Soc.* 1906, p. 2 (*Abs. P.Z.S.* 1906, p. 1); *Matschie, Ann. Mus. Congo, Zool.* ser. 5, vol. i, p. 8, 1906; *Allen, Proc. Biol. Soc. Washington*, vol. xxiii, p. 49, 1909.

Hylochœrus meinertzhageni rimator, *Lydekker, Game Animals of Africa*, p. 398, 1908.

Typical locality Ja Valley, Cameruns.

Generally similar to typical race,* but cheek-teeth,

* *Vide* Allen, *op. cit.*

especially the last molar in each jaw, markedly narrower, with less cement in the valleys.

6. 2. 21. 1. Skull, female. Ja Valley, Cameruns; collected by G. L. Bates, Esq. Type. *Purchased*, 1906.

8. 6. 23. 13. Skull and skin, immature. Cameruns; same collector. *Purchased*, 1908.

14. 4. 16. 1. Skin, mounted. Cameruns.
*Presented by the Rowland Ward Trustees*, 1914.

## V. Genus PHACOCHŒRUS.

Phacochœrus, *Cuvier*, *Règne Animal*, vol. i, p. 236, 1817; *Owen*, *Phil. Trans.* 1850, p. 481; *Gray*, *Cat. Carnivora, etc. Brit. Mus.* p. 359, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 69, 1873; *W. L. Sclater*, *Fauna S. Africa*, *Mamm.* vol. i, p. 276, 1960; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvii, p. 376, 1900.

Phascochœrus, *F. Cuvier*, *Mém. Mus. Paris*, vol. viii, p. 451, 1817.

Eureodon, *Fischer*, *Mém. Soc. Moscou*, vol. v, p. 373, 1817.

Phöcochörus, *Voigt*, *Uebersicht Naturgesch.* p. 422, 1819.

Phascochaeres, *Cretzschmar*, *Atlas to Rüppell's Reise nordl. Afrika*, p. 61, 1826; *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. v, p. 219, 1836.

Phascochaerus, *Griffith*, *Animal Kingdom*, vol. v, p. 289, 1827.

Phacocherus, *Smuts*, *Enum. Mamm. Cap.* p. 60, 1832.

Phacellochœrus *and* Phacellochærus, *Hemprich und Ehrenberg*, *Symbol. Phys.*, *Mamm.* vol. ii, pl. xx, 1832.

Dinochœrus, *Gloger*, *Handbuch Naturgesch.* vol. i, pp. xxxii and 131, 1841.

Macrocephalus, *Elliot* (ex *Frisch*, 1775), *Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 32, 1907.

Dentition: $i.\frac{1}{3}$, $c.\frac{1}{1}$, $p.\frac{3}{2}$, $m.\frac{3}{3} = 34$; outer incisors and anterior premolars lost early, and in some cases all the teeth except the canines and last molars wanting; upper canines, which are devoid of enamel except at the tips, very large, massive, and longer than lower pair, the attrition of the latter forming merely a facet on the lower surface of the former and not touching their summits; last molars in both jaws, very large, hypsodont, and formed of a closely packed series of small parallel and vertical subcylindrical denticules; canines of females relatively large; face much flattened, with a very wide muzzle, and two pairs of triangular warty tubercles, the upper and larger pair situated immediately

below the eyes (fig. 54); ears small and triangular; coat sparse and bristly, almost completely shed in adults, with the exception of a mane on the neck and a terminal tail-tuft; skull wide and long, much depressed, with a deeply concave profile, a very short postorbital portion, and no lateral angulation of the nasal region; prenasal ossicle separate from nasals. Young uniformly coloured.

The range embraces suitable localities throughout Ethiopian Africa.

## PHACOCHŒRUS ÆTHIOPICUS.

Aper æthiopicus, *Pallas, Spicil. Zool.* fasc. ii, p. 2, 1767.

Sus æthiopicus, *Linn. Syst. Nat.* ed. 12, vol. i, p. 223, 1768; *Erxleben, Syst. Regn. Anim.* vol. i, p. 187, 1777; *Griffith, Animal Kingdom*, vol. iii, p. 333, 1827.

Phacochœrus æthiopicus, *Cuvier, Règne Animal*, vol. i, p. 1817; *F. Cuvier, Dent. Mamm.* p. 217, pl. xxviii, 1822; *J. B. Fischer, Synop. Mamm.* p. 424, 1829; *Gray, List Mamm. Brit. Mus.* p. 185, 1843, *Proc. Zool. Soc.* 1868, p. 48, *Cat. Carnivora, etc. Brit. Mus.* p. 353, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 69, 1873; *Sclater, Proc. Zool. Soc.* 1850, p. 78, pl. xvii, 1860, p. 443; *Giebel, Säugethiere*, p. 236, 1855; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 279, 1862; *Fitzinger, Sitzber. k. Ak. Wiss. Wien*, vol. xix, pt. 1, p. 39, 1864; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 363, 1884; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 197, 1891, *Fauna S. Africa, Mamm.* vol. i, p. 277, 1900; *Flower and Lydekker, Study of Mammals*, p. 289, 1891; *Nicolls and Eglington, Sportsman in S. Africa*, p. 77, 1892; *Lydekker, Horns and Hoofs*, p. 370, 1893, *Great and Small Game of Africa*, p. 517, 1899, *Game Animals of Africa*, p. 399, 1908, *Suppl.* p. 23, 1911; *Stehlin, Abh. schweiz. pal. Ges.* vol. xxvi, p. 276, 1899; *Rothschild, Powell-Cotton's Abyssinia*, p. 482, 1902, *Alexander, From Niger to Nile*, vol. ii, p. 394, 1907; *Drake-Brockman, Mamm. Somali.* p. 100, 1910; *Ward, Records of Big Game*, ed. 6, p. 458, 1910, ed. 7, p. 457, 1914.

Phascochœrus æthiopicus, *F. Cuvier, Mém. Mus. Paris*, vol. viii, p. 450, pl. xxiii, 1817.

Phacochœrus barbatus, *Temminck, Mon. Mamm.* vol. i, p. 29, 1827.

Phascochœrus edentatus, *I. Geoffroy, Dict. Class. Hist. Nat.* vol. xiii, p. 320, 1828.

Phacochœrus typicus, *A. Smith, S. African Quart. Journ.* vol. ii, p. 90, 1834.

Phacochœrus pallasi, *Van der Hoeven, Nova Acta Ac. Cæs. Leop.-Car.* vol. xix, p. 171, 1839; *Owen, Proc. Zool. Soc.* 1851, p. 63, *Ann. Mag. Nat. Hist.* ser. 2, vol. xi, p. 246, 1853.

Phacochœrus aper æthiopicus, *Reichenbach, Pachyderm.* p. 35, 1846.

Wart-Hog.

Typical locality South Africa; range co-extensive with that of the genus.

Shoulder-height reaching about 30 inches; general colour of the sparse coat brownish grey, with a more or less distinct

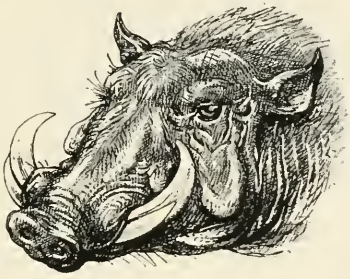


Fig. 54.—Head of Wart-Hog (*Phacochœrus æthiopicus*).

rufous tinge; very large upper tusks measure as much as from 25 to 27 inches along the convexity, but the length of lower ones seldom exceeds 6 inches.

The local races, according to a scheme by Lönnberg, are distinguished as follows:—

A. Postorbital portion of skull very short and wide, its length and breadth percentages to skull-length being 10 and 13½; interorbital width large, 36·5 %..... *P. æ. æthiopicus.*

B. Postorbital region less wide, 10·9–10·5 and 11·9–11·5 %; interorbital width less, 34·7–33 %..... *P. æ. delamerei.*

C. Postorbital region of medium length and width 13·4 and 13·1 %; interorbital width less than in any other race, 30 %..... *P. æ. africanus.*

D. Postorbital region much the same as in last, 14 and 14 %; interorbital width considerably greater, 38·8 %..... *P. æ. massaicus.*

E. Postorbital region of medium length but narrow, 13·7 and 11 %; interorbital width relatively small, 32·3 %..... *P. æ. sundevalli.*

F. Postorbital region very long and very narrow, 15·4 and 6·3 %; interorbital width as in last, 32·3 %..... *P. æ. æliani.*

## A.—Phacochœrus æthiopicus æthiopicus.

Phacochœrus æthiopicus typicus, *Kirby, Great and Small Game of Africa*, p. 527, 1809.

Typical locality South Africa.

Size medium; some of the lower anterior teeth usually

retained in old age; postorbital portion of skull very short and wide, the respective percentages to the skull-length being 10·3 × 13·3; interorbital width also great, 36·5 per cent.

74, *a* (719, *t*). Skull, from a stuffed specimen. South Africa. *Presented by Dr. W. J. Burchell*, 1817.

719, *a*. Skull, female. South Africa.
*Presented by J. C. Taunton, Esq.*, 1836.

50. 8. 24. 24–30. Nine imperfect skulls and upper jaws. South Africa. *Purchased* (*Argent*), 1850.

6. 1. 22. 5 (765, *b*). Skeleton, female, provisionally referred to this race. Locality unknown.
*Purchased* (*Zoological Society*), 1862.

62. 9. 26. 1. Left upper tusk, from a stuffed skin, provisionally referred to this race. Locality unknown. Length along outer curve $15\frac{3}{8}$ inches.
*Presented by H. Merryweather, Esq.*, 1862.

71. 7. 3. 4 (719, *o*). Skull, young. Port Elizabeth, Cape Colony. *Purchased* (*Gerrard*), 1871.

81. 5. 11. 2 (719, *r*). Skull. South Africa.
*Presented by R. G. Breakes, Esq.*, 1881.

## B.—Phacochœrus æthiopicus sundevalli.

Phacochœrus sundevallii, *Lönnberg, Sjöstedt's Kilimandjaro-Meru Exped., Mamm.* p. 54, 1908, *Proc. Zool. Soc.* 1908, p. 937.

Phacochœrus æthiopicus sundevalli, *Lydekker, Game Animals of Africa, Suppl.* p. 23, 1911.

Typical locality Natal; the range probably includes at least a portion of the Transvaal, and may extend still further north.

Type in Royal Swedish Museum of Natural History, Stockholm.

Postorbital region of skull moderately elongated but narrow, 13·7 × 11 per cent.; interorbital width relatively small, 32·3 per cent.; the one upper and one or two pairs of lower incisors persistent.

46. 6. 2. 75 (719, $a^1$). Skull, female, provisionally referred to this race. Transvaal; collected by J. Wahlberg.
*By exchange with the Stockholm Museum*, 1846.

83. 7. 28. 11. Skin, female, probably belonging to this or

a nearly allied race. Umfule Valley, Mashonaland; collected by F. C. Selous, Esq. *Purchased*, 1883.

86. 5. 5. 5. Skin, mounted, racially identical with the preceding specimen. Sarna Valley, Mashonaland; same collector. *Purchased*, 1886.

*The following specimens, according to Lönnberg, represent a race allied to, and yet distinct from,* P. æ. sundevalli, *the interorbital region being still narrower :—*

91. 9. 5. 3 (719, *w*). Skull. Ukanga, Nyasaland. Noticed by Lönnberg, *Proc. Zool. Soc.* 1908, p. 939.
*Presented by Sir H. H. Johnston, G.C.M.G., K.C.B.*, 1891.

91. 9. 5. 4 (719, *x*). Skull, female. Same locality.
*Same history.*

93. 7. 2. 29–30. Two skulls. Shiri Highlands, Nyasaland; collected by A. Whyte, Esq. *Same donor*, 1893.

93. 7. 25. 11. Skull. Near Lake Mweru, N. W. Rhodesia; collected by R. Crawshay, Esq. *Same history.*

94. 3. 8. 17. Skull. Same locality and collector. Noticed by Lönnberg, *op. cit.* p. 938. *Same donor*, 1894.

94. 3. 8. 17. Skull, immature. Same locality and collector. Noticed, *loc. cit.* *Same history.*

8. 2. 14. 1. Skull. Angoniland, South Uganda. Noticed, *op. cit.* p. 937. *Presented by C. B. Storey, Esq.*, 1908.

8. 2. 14. 2. Skull, young. Same locality. Noticed, *loc. cit.* *Same history.*

*The following specimens accord with this race in the relative narrowness of the interorbital region :—*

8. 1. 31. 6. Skull and skin, immature female. Athi Valley, British East Africa.
*Presented by the Master of Belhaven*, 1908.

12. 7. 28. 2. Skull and skin, immature. Mau Forest, above Njoro, British East Africa.
*Presented by C. W. Woodhouse, Esq.*, 1912.

12. 7. 28. 3. Skull and skin, immature. Same locality.
*Same history.*

12. 7. 28. 4. Skull, immature. Same locality.
*Same history.*

12. 7. 28. 5. Skull, immature. Same locality.
*Same history.*

12. 7. 28. 6. Skull, old boar. Same locality. Interorbital width $4\frac{1}{2}$ inches. *Same history.*

12. 7. 28. 7. Skull, old boar. Same locality. Interorbital width $4\frac{1}{2}$ inches. *Same history.*

12. 7. 28. 8. Skull, immature. Same locality.
*Same history.*

## C.—Phacochœrus æthiopicus massaicus.

Phacochœrus massaicus, *Lönnberg, Sjöstedt's Kilimandjaro-Meru Exped., Mamm.* p. 54, 1908, *Proc. Zool. Soc.* 1908, p. 937, *K. Svenska Vet.-Ak. Handl.* vol. xlviii, no. 5, p. 142, 1912.

Phacochœrus æthiopicus massaicus, *Lydekker, Game Animals of Africa, Suppl.* p. 23, 1911.

Typical locality Masailand (Kilimanjaro-Meru district), German East Africa.

Type in Royal Swedish Museum of Natural History, Stockholm.

Postorbital region of medium length and width, 14 × 14 per cent.; interorbital width relatively great, 38·8 per cent.

95. 4. 3. 42. Skull, immature, provisionally associated by Lönnberg, *Proc. Zool. Soc.* 1908, p. 938, with this race. Uganda. The relative shortness of the postorbital region may be a feature of immaturity.

*The following specimens accord with this race in the great relative width of the interorbital region, which is considerably greater than in the British East African specimens entered under the heading of the preceding race:—*

1. 8. 9. 54. Skull and skin, immature. Malo, Uganda.
*Presented by Sir H. H. Johnston, G.C.M.G., K.C.B.*, 1901.

1. 8. 9. 55. Skull and skin, immature female. Same locality. *Same history.*

1. 8. 9. 56. Skull and skin, immature. Same locality.
*Same history.*

5. 4. 3. 41. Skull, female. S. W. Ankoli, Uganda. Interorbital width $5\frac{1}{8}$ inches.
*Presented by Lieut.-Col. C. Delmé-Radcliffe*, 1905.

5. 4. 3. 42. Skull, female. Same locality. Interorbital width $5\frac{1}{2}$ inches. *Same history.*

5. 4. 3. 43. Skull, female. Same locality. *Same history.*

## D.—Phacochœrus æthiopicus delamerei.

Phacochœrus delamerei, *Lönnberg*, *Proc. Zool. Soc.* 1908, p. 240, *K. Svenska Vet.-Ak. Handl.* vol. xlviii, no. 5, p. 140, 1912.

Phacochœrus æthiopicus delamerei, *Lydekker*, *Game Animals o Africa*, *Suppl.* p. 23, 1911.

Typical locality Northern Somaliland.

Proportions of postorbital region of skull much the same as in typical race, although the width is rather less, 10·9–10·5 × 11·9–11·5 per cent.; interorbital width relatively great, 34·7–33 per cent.

There has been some doubt with regard to the locality where this race is found, but it is practically certain that one or other of the undermentioned skulls presented by Lord Delamere was taken from the north Somali animal of which the head is figured on page 401 of *Game Animals of Africa*.

0. 3. 27. 16. Skull. Somaliland. Co-type. Except for some vestiges in the mandible, both upper and lower incisors have been worn away. *Presented by the Lord Delamere*, 1900.

0. 3. 27. 17. Skull. Same locality. Co-type. Two pairs of lower incisors are retained. *Same history.*

6. 5. 4. 12. Skull and skin, female, provisionally referred to this race. S.W. of Berbera, Somaliland.

*Presented by Dr. R. E. Drake-Brockman*, 1906.

## E.—Phacochœrus æthiopicus æliani.

Phascochœres æliani, *Cretzschmar*, *Atlas to Rüppell's Reise nordl. Afrika*, p. 61, pls. xxv *and* xxvi, 1826; *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. v, p. 219, pl. xxiv, 1836.

Phacochœrus edentatus, *I. Geoffroy*, *Dict. Class. Hist. Nat.* vol. xiii, p. 320, 1828.

Phacelochœrus haroja, *Hemprich and Ehrenberg*, *Symbol. Phys.* pl. xx, 1836.

Phacochœrus æliani. *Gray*, *List Mamm. Brit. Mus.* p. 185, 1843; *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 280, 1862; *Sclater*, *Proc. Zool. Soc.* 1869, p. 276, pl. xx, 1871, p. 236; *Blanford*, *Zool. Abyssinia.* p. 241, 1870; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvii, pl. x, fig. 6, 1900; *Lönnberg*, *Sjöstedt's Kilimandjaro-Meru Exped.* p. 53, 1908, *Proc. Zool. Soc.* 1908, p. 937.

Phacochœrus sclateri, *Gray, Ann. Mag. Nat. Hist.* ser. 4, vol. vi, pp. 189 and 263, 1870; *Selater, ibid.* p. 404, 1870.

Phacochœrus haroia, *Lönnberg, Sjöstedt's Kilimandjaro-Meru Exped.* p. 53, 1908.

Typical locality Abyssinia.

The upper incisors shed and the lower ones usually worn down to the roots in aged animals, which may retain only the canines and last molars; postorbital region very long and very narrow, 15·4 × 6·3 per cent.; interorbital width as in *P. æ. sundevalli*, 32·3 per cent.

719, *r*. Skeleton and skin. Abyssinia; collected by Dr. Rüppell. Co-type. *Purchased.*

69. 2. 2. 12 (765, *e*). Skeleton, mounted. Annesley Bay, Abyssinia; collected by W. Jesse, Esq., during the Abyssinian Expedition, under Lord Napier of Magdala.

*Presented by the Viceroy and Council of India*, 1869.

69. 10. 24. 47 (719, *q*). Skull. Zulla, Abyssinia; collected by Dr. W. T. Blanford during the above-mentioned expedition. Noticed by Lönnberg, with measurements, *Proc. Zool. Soc.* 1908, p. 937. *Same history.*

## F.—Phacochœrus æthiopicus fossor.

Phacochœrus æthiopicus fossor, *Schwarz, Ann. Mag. Nat. Hist.* ser. 8, vol. xi, p. 266, 1913.

Typical locality Ketekma, Bagirmi, N.W. Central Africa. Type in Senckenberg Museum, Frankfurt-am-Main.

Skull heavier than in *P. æ. æliani*, with the profile less concave in the frontal but more so in the nasal region, the occiput lower and wider, the jugal deeper and placed less nearly vertically, and the lower canines more procumbent, but directed more backwards at tips.

7. 7. 8. 257. Skull and skin, immature female, provisionally referred to this race. Yo, Lake Chad district.

*Presented by the Alexander-Gosling Expedition*, 1907.

## G.—Phacochœrus æthiopicus bufo.

Phacochœrus africanus bufo, *Heller, Smithson. Misc. Collect.* vol. lxi, no. 22, p. 2, 1914; *Allen. Bull. Mus. Harvard Coll.* vol. lviii, p. 324, 1914.

Typical locality Lado Enclave.

Type in U.S. National Museum, Washington.

Differs from *P. æ. æliani* by the greater breadth and length of the postorbital portion of the skull, the more nearly flat interorbital region, and the greater extension of the premaxillæ beyond the sockets of the tusks, as well as by the lack of elevation in the parietal and occipital crests, and the smaller auditory bullæ. Incisors are retained in the adults.

9. 7. 15. 2. Skull. Lado Enclave.

*Purchased* (*Giza Zoological Gardens*), 1909.

## H.—Phacochœrus æthiopicus africanus.

Sus africanus, *Gmelin, Linn.'s Syst. Nat.* vol. i, p. 222, 1778; *Griffith, Animal Kingdom*, vol. iii, p. 332, 1827.

Phascochœrus africanus, *F. Cuvier, Mém. Mus. Paris*, vol. viii, p. 452, pl. xxiii, 1817; *Desmarest, Mammalogie*, vol. ii, p. 593, 1822; *A. Smith, Cat. S. African Mus., Mamm.* p. 16, 1826; *Lesson, Man. Mamm.* p. 341, 1827.

Phacochœrus africanus, *F. Cuvier, Dents Mamm.* p. 213, pl. lxxxvii, 1825; *J. B. Fischer, Synop. Mamm.* p. 424, 1829; *Peters, Reise Mossamb.* vol. i, 181, 1852; *Giebel, Säugethiere*, p. 237, 1855; *Kirk, Proc. Zool. Soc.* 1864, p. 656; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 360, 1884; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 197, 1891; *Flower and Lydekker, Study of Mammals*, p. 289, 1891; *Lydekker, Horns and Hoofs*, p. 370, 1893, *Great and Small Game of Africa*, p. 517, 1899; *Matschie, Säugeth. Deutsch-Ost-Afrika*, p. 100, 1895; *Elliot, Field Mus. Zool. Pub.* vol. i, p. 109, 1897; *Lönnberg, Sjöstedt's Kilimandjaro-Meru Exped., Mamm.* p. 53, 1908, *Proc. Zool. Soc.* 1908, p. 936; *Cabrera, Cat. Met. Mam. Mus. Madrid*, p. 133, 1912; *Newberry, Klio*, vol. xii, p. 397, 1912.

Phascochaerus africanus, *Griffith, Animal Kingdom*, vol. v, p. 289, 1827, *partim.*

Phacochœrus æthiopicus africanus, *Inverarity, Great and Small Game of Africa.* p. 521, 1899; *Lydekker, Game Animals of Africa*, p. 400, 1907, *Suppl.* p. 73, 1911, *Ward's Records of Big Game*, ed. 7, p. 458, 1914.

Macrocephalus africanus, *Elliot, Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 83, 1907.

Typical locality Cape Verd, Senegambia.

Size very large, probably greater than in any other race, the upper skull-length being $17\frac{3}{4}$ inches (445 mm.); postorbital region relatively long and wide, 59 × 58 mm. = 13·4 × 13·1 per cent.; interorbital region relatively narrow, 30 per cent.

46. 8. 7. 24 (719, *b*). Skull. Cape Verd. Topo-type. *Presented by T. Tatum, Esq.*, 1836.

*The reference of the following specimen to this race is provisional:—*

65. 5. 3. 5 (719, *u*). Skull. Nigeria; collected by Dr. W. B. Baikie. *Purchased* (*Stevens*), 1865.

### Subfamily ii.—DICOTYLINÆ.

Fore-feet with four and hind-feet with three complete toes; 32 teeth, the dental formula being $i.\frac{2}{3}$, $c.\frac{1}{1}$, $p.\frac{3}{3}$, $m.\frac{3}{3}$; upper canines comparatively short, straight, and directed downwards; stomach complex; a dorsal gland; 2 teats; tail rudimentary; upper ends of third and fourth metacarpals and metatarsals united.

The distribution is restricted to the New World, where peccaris range from Arkansas and Texas to the Rio Negro of Patagonia.

## VI. Genus DICOTYLES.

Tayassu, *Fischer*, *Zoognosia*, vol. iii, p. 284, 1814; *Miller*, *List N. Amer. Mamm.* p. 384, 1912; *recommended for suppression in favour of* Dicotyles *by "fiat" of International Commission of Zoological Nomenclature*, 1914, *vide Zool. Anz.* vol. xliv, p. 285.

Dicotyles, *Cuvier*, *Règne Animal*, vol. i, p. 237, 1817; *Griffith*, *Animal Kingdom*, vol. v, p. 289, 1827; *Gray*, *Proc. Zool. Soc.* 1868, p. 58, *Cat. Carnivora, etc. Brit. Mus.* p. 351, 1869; *Elliot*, *Synop. Mamm. N. Amer.* (*Field Mus. Zool. Pub.*) vol. ii, p. 33, 1901; *Loomis*, *Amer. J. Sci.* vol. xxx, p. 383, 1910; *Houv*, *Anat. Hefte Wiesbaden*, Abt. 1, vol. xl, p. 717, 1910.

Notophorus, *Fischer*, *Mém. Soc. Moscou*, vol. v, p. 373, 1817.

Dicotylus, *Bowdich*, *Anal. Nat. Classif. Mamm.* p. 71, 1821.

Adenonotus, *Brookes*, *Cat. Mus.* p. 11, 1828.

Dycoteles, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. v, p. 234 (1836); *Blyth*, *Cuvier's Anim. Kingdom*, p. 131, 1840.

Dicotyle, *Gervais and Ameghino*, *Mamm. Foss. Amer. Sud.* p. 110, 1880.

Dycotyles, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. viii, p. 54, 1896.

Olidosus, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 120, 1901.

Tagassu, *Elliot* (ex *Frisch*), *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 66, 1904.

Tayassus, *Trouessart*, *Cat. Mamm., Suppl.* p. 658, 1904.

Small, tailless, pig-like animals, with thick bristly coats, small, ovate, erect ears, and a large glandular area rather behind the middle of the back, which secretes a strongly-smelling musky oleaginous substance.

The subfamily is divisible into the two following subgenera (genera of many naturalists) :—

A. Mane and dorsal crest long, and reaching rump; nasals and sides of cranial rostrum flattened; palate broad.... *Dicotyles.*

B. Mane and dorsal crest shorter and not reaching rump; nasals and sides of cranial rostrum not flattened; palate narrow..... *Pecari.*

## 1. Subgenus **DICOTYLES.**

Mane and dorsal crest long and extending backwards to rump; upper surface of nasals and sides of cranial rostrum flattened, the latter not divided by zygomatic ridge, which rises abruptly to top of skull, where it dies out above second premolar; palate broad and flat, without ridge between anterior premolar and inner surface of canine; no depression on preorbital portion of zygomatic root.

The distributional area extends from Mexico to Paraguay.

### I. DICOTYLES PECARI.

Tayassu pecari, *Fisher*, *Zoognosia*, vol. iii, p. 285, 1814; *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 165, 1902; *Miller*, *List N. Amer. Mamm.* p. 384, 1912.

Sus albirostris, *Illiger*, *Abh. Ak. Sci. Berlin*, 1811, p. 115, 1815 (separate copies are stated to have been issued in 1811).

Dicotyles labiatus, *Cuvier*, *Règne Animal*, vol. i, p. 237, 1817; *Desmarest*, *Mammalogie*, vol. ii, pp. 394 *and* 620, 1822; *Griffith. Animal Kingdom*, vol. v, p. 290, 1827; *Rengger*, *Säugeth. Paraguay*, p. 322, 1830; *Tschudi*, *Fauna Peruv.* p. 217, 1844; *Frantzius*, *Arch. Naturgesch.* vol. i, p. 296, 1855; *Burmeister*, *Syst. Uebersicht*, vol. i, p. 325, 1855, *Descrip. Phys. Répub. Argent.* vol. iii, p. 472, 1879; *Gray*, *Proc. Zool. Soc.* 1868, p. 45, *Cat. Carnivora, etc. Brit. Mus.* p. 352, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 54, 1873; *Alston*, *Biol. Centr.-Amer.*, *Mamm.* p. 108, pl. x, 1882; *Flower and Garson*, *Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 343, 1884; *Lydekker*, *Cat. Foss. Mamm. Brit. Mus.* pt, ii, p. 251, 1885, *Great and Small Game of Europe, etc.* p. 383, 1901; *Flower and Lydekker*, *Study of Mammals*, p. 290, 1891; *Stehlin*, *Abh. schweiz. pal. Ges.* vol. xxvi, p. 209, 1899; *Weber*, *Säugethiere*, p. 652, 1904.

Notophorus pecari, *Fischer*, *Mém. Soc. Moscou*, vol. v, p. 373, 1817.

Adenonotus labiatus, *Brookes*, *Cat. Mus.* p. 11, 1828.

Dycoteles labiatus, *Jardine*, *Naturalist's Libr.*, *Mamm.* vol. v, p. 236, pl. xxvii, 1836.

Dicotyles albirostris, *Wagner*, *Schreber's Säugthiere*, *Suppl.* vol. iv, p. 306, 1844.

Sus labiatus, *Gerrard*, *Cat. Bones Mamm. Brit. Mus.* p. 281, 1862.

Tagassu pecari, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 66, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 35, 1905, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 35, 1907.

Tayassu albirostris, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 120, 1901; *Goldman*, *ibid.* vol. xxv, p. 189, 1912.

Tayassus albirostris, *Trouessart*, *Cat. Mamm.*, *Suppl.* p. 659, 1904.

White-lipped Peccari; Wari.

The type species.

Typical locality Paraguay.

Size relatively large (length of head and body about 40 to 46 inches); general colour typically dark reddish brown and black, passing into rufous on face and crown, with the upper lips, top of nose, chin, throat, breast, and under-parts white.

The following three races are recognised:—

A. Breast and under-parts white ..... *D. p. pecari.*

B. Breast and under-parts grizzled black and fulvous.

*a*. White face-markings more extensive than in typical race ..... *D. p. ringens.*

*b*. White face-markings still more extensive ..... *D. p. spiradens.*

## A.—Dicotyles pecari pecari.

Tayassu pecari pecari, *Miller*, *List N. Amer. Mamm.* p. 384, 1912.

Tayassus albirostris albirostris, *Goldman*, *Proc. Biol. Soc. Washington*, vol. xxv, p. 189, 1912.

Typical locality Paraguay.

Face-markings of moderate extent; under-parts white.

152, *b*. Skin, young (?). Brazil. *Purchased*, 1835.

42. 8. 17. 1. Skin, mounted. Brazil. *Purchased* (*Clausen*), 1842.

43. 2. 20. 6 (721, *b*). Skull, immature. Brazil. *Purchased* (*Stevens*), 1843.

43. 9. 27. 24. Skin, female. Bahia, Brazil. *Purchased* (*Brandt*), 1843.

45. 2. 13. 4 (721, *a*). Skull, immature (from an old skin). Brazil. *Purchased* (*Cross*), 1845.

46. 6. 1. 27. Skin. Santa Catherina, Brazil.
*Purchased* (*Parzudaki*), 1846.

47. 4. 6. 8 (721, *d*). Skeleton, female. Brazil.
*Purchased* (*Barker*), 1847.

47. 4. 6. 9 (721, *c*). Skeleton. Brazil. *Same history.*

51. 8. 27. 76 (721, *e*). Skull. Para, Brazil.
*Purchased* (*Stevens*), 1851.

61. 4. 8. 2 (721, *f*). Skeleton. Brazil.
*Purchased* (*Zoological Society*), 1861.

62. 12. 15. 112–113. Two young specimens, in alcohol. British Guiana. *Purchased* (*Leadbeater*), 1862.

84. 2. 8. 17. Skull. Taquara, Rio Grande do Sul, Brazil; collected by Dr. H. von Ihering. *Purchased*, 1884.

84. 2. 8. 18. Skull. Same locality and collector.
*Same history.*

99. 2. 22. 10. Skull and skin. Entre Rios.
*Presented by the La Pluta Museum*, 1899.

3. 7. 7. 121. Skull and skin, female. Chapada, Matto Grosso, Brazil; collected by Mr. A. Robert.
*Presented by Mrs. Percy Sladen*, 1913.

3. 7. 7. 122–123. Two young skulls. Same locality and collector. *Same history.*

*The following specimens from British Guiana are provisionally referred to this race:—*

10. 5. 4. 67. Skull and skin, very young. Rio Supinaam Valley, British Guiana.
*Presented by F. V. McConnell, Esq.*, 1910.

10. 6. 12. 1. Skull. Lama Creek, British Guiana.
*Presented by B. Howell Jones, Esq.*, 1910.

10. 9. 29. 32. Skull and skin. Supinaam Valley.
*Presented by F. V. McConnell, Esq.*, 1910.

11. 6. 7. 49. Skull and skin, very young. Moon Mountains, southern British Guiana. *Same donor*, 1911.

11. 12. 15. 5. Skull, young. Bartica Grove, Essequibo Valley, British Guiana. *Same history.*

12. 12. 19. 13. Skull and skin. Bonasica Creek, British Guiana. *Same donor*, 1912.

12. 12. 19. 14. Skull and skin. Same locality. *Same history.*

12. 12. 19. 15. Skull and skin. Same locality. *Same history.*

13. 6. 8. 14. Skull and skin. Manarica Creek, Essequibo Valley. *Same donor*, 1913.

13. 12. 12. 4. Skull and skin, very young. Supinaam Valley. *Same history.*

## B.—Dicotyles pecari ringens.

Tayassu albirostris ringens, *Merriam, Proc. Biol. Soc. Washington*, vol. xiv, p. 121, 1901.

Tayassu pecari ringens, *Allen, Bull. Amer. Mus. Nat. Hist.* vol. xvi, p. 166, 1902; *Miller, List Mamm. N. Amer.* p. 384, 1912.

Tagassu pecari ringens, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 66, 1904, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 37, 1905.

Typical locality Apazote, State of Campeche, Mexico.

Type in U.S. National Museum, Washington.

Similar in general characters to typical race, but with a greater extension of whitish face-markings—the light area including the whole muzzle from tip to midway between nose and eyes, and extending backwards along sides of lower jaw to below ears—the presence of an ill-defined white band above each pair of hind-hoofs, and the grizzled black and fulvous under-parts.

No specimen in collection.

## C.—Dicotyles pecari spiradens.

Tayassu albirostris spiradens, *Goldman, Proc. Biol. Soc. Washington*, vol. xxv, p. 189, 1912.

Typical locality Talamanca, Costa Rica.

Type in U.S. National Museum, Washington.

Resembles *D. p. ringens* in size and colour, but still more white on face, sometimes extending to eyes; molars wider and first lower premolar smaller. Distinguished from *T. p. pecari* by more convex profile of brain-case, the narrower front portion of lower premolars, and more evenly tapering lower cheek-teeth row.

No specimen in collection.

## 2. Subgenus **PECARI.**

Pecari, *Reichenbach, Bildergal. Thierwelt*, pt. vi, p. 1, 1835; *Miller, List N. Amer. Mamm.* p. 383, 1912.

Mane and dorsal crest shorter than in typical subgenus and not covering rump; upper surface of nasals and sides of cranial rostrum not flattened, the latter divided by a more or less pronounced zygomatic ridge; palate long and narrow, with a more or less distinct anterior median ridge, and a depression in preorbital portion of zygomatic root above premolars.

Range co-extensive with that of genus.

The two species are distinguished as follows:—

A. Skull with slight basal angulation of nasals, palatal ridge, and preorbital depression ..... *D.* (*P.*) *tajacu.*

B. Skull with strongly marked basal angulation of nasals, prominent palatal ridge, and deep preorbital depression in anterior zygomatic root ..... *D.* (*P.*) *angulatus.*

## II. DICOTYLES (PECARI) TAJACU.

Sus tajacu, *Linn. Syst. Nat.* ed. 10, vol. i, p. 50, 1758, ed. 12, vol. i, p. 103, 1766.

Sus tajassu, *Erxleben, Syst. Regn. Anim.* p. 188, 1777.

Dicotyles torquatus, *Cuvier, Règne Animal*, vol. i, p. 237, 1817; *Desmarest, Mammalogie*, vol. ii, p. 393, 1822; *Griffith, Animal Kingdom*, vol. v, p. 289, 1827; *Rengger, Säugeth. Paraguay*, p. 322, 1830; *Tschudi, Fauna Peru*, p. 216, 1844; *Frantzius, Arch. Naturgesch.* vol. i, p. 296, 1855; *Burmeister, Syst. Uebersicht*, vol. i, p. 327, 1855, *Descrip. Phys. Répub. Argent.* vol. iii, p. 473, 1879; *Baird, Mamm. N. Amer.* p. 627, 1857; *Sclater, Proc. Zool. Soc.* 1860, p. 206; *Tomes, ibid.* 1861, p. 287; *Stehlin, Abh. schweiz. pal. Ges.* vol. xxvi, p. 208, 1899.

Adenonotus tajacu, *Brookes, Cat. Mus.* p. 11, 1828.

Dycoteles torquatus, *Jardine, Naturalist's Libr., Mamm.* vol. v, p. 234, pl. xxvi, 1836.

Dicotyles tajacu, *Gray, List Mamm. Brit. Mus.* p. 186, 1843; *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 280, 1862; *Sclater, List Anim. Zool. Gardens*, p. 19, 1862; *Alston, Biol. Centr.-Amer., Mamm.* p. 102, 1882; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 344, 1884; *Lydekker, Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 252, 1885, *Great and Small Game of Europe, etc.* p. 371, 1901; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 196, 1891; *Flower and Lydekker, Study of Mammals*, p. 290, 1891; *Elliot, Synop. N. Amer. Mamm. (Field. Mus. Zool Pub.* vol. ii) p. 33, 1901; *Weber, Säugethiere*, p. 652, 1904.

Notophorus torquatus, *Gray, Proc. Zool. Soc.* 1868, p. 44, *Cat. Carnivora, etc. Brit. Mus.* p. 351, 1871; *Hand-List Thick-skinned Mamm. Brit Mus.* p. 53, 1873.

Tayassu tayassu, *Stone and Cram, American Animals*, pl. facing p. 30, 1903.

Pecari Tajacu.

Typical locality Brazil.

Smaller than *D. pecari*, the average length of the head and body being about 36 inches; general colour dark blackish grey, with a white or whitish band passing across the chest from shoulder to shoulder.

The following races are recognised:—

A. General colour grizzled grey or tawny.
  *a*. Skull relatively large, long, narrow, and vaulted.... *D. t. tajacu.*
  *b*. Skull smaller, shorter, wider and depressed..... *D. t. torvus.*
B. General colour almost uniform black..... *D. t. niger.*

## A.—Dicotyles tajacu tajacu.

Typical locality southern Brazil.

Skull relatively large, long, narrow, and vaulted; general colour grizzled grey or tawny.

720, *i*. Skull. Locality unknown.* *No history.*

38. 4. 16. 86. Skull. Locality unknown.
*Purchased* (*Stevens*), 1838.

41. 12. 20. 1 (35, *b*). Skin, mounted. Locality unknown.
*Presented by R. Cross, Esq.*, 1841.

55, *h*. Skin, immature, mounted. *No history.*

43. 5. 16. 8 (720, *a*). Skull. Organ Mountains, Brazil; collected by Dr. Gardner. *Purchased*, 1843.

44. 2. 7. 11. Skin, young. Locality unknown.
*Purchased* (*Leadbeater*), 1844.

50. 11. 22. 49 (720, *c*). Skull. Locality unknown.
*Purchased* (*Zoological Society*), 1850

55. 12. 26. 154 (720, *d*), Skull. Locality unknown.
*Same history*, 1855.

56. 12. 30. 2 (720, *e*). Skeleton. Locality unknown.
*Same history*, 1856.

* The reference to this race of specimens of unknown locality is provisional.

58. 5. 4. 44 (720, *f*). Skull. Locality unknown. *Same history*, 1858.

58. 5. 4. 116 (720, *g*). Skeleton, mounted, Locality unknown. *Same history.*

60. 2. 11. 15. Skin, young, mounted. Locality unknown. *Purchased* (*Verreaux*), 1860.

67. 4. 12. 207. Skin. Locality unknown. *Presented by Capt. Milner*, 1867.

84. 2. 8. 19. Skull, immature female. Taquara, Rio Grande do Sul; collected by Dr. H. von Ihering. *Purchased*, 1884.

97. 10. 3. 17. Skull. Chanchamayo, Peru; collected by Mr. J. Kalinowski. *Purchased*, 1897.

1. 2. 7. 53. Skull and skin, young. Pereque, São Paulo, Brazil; collected by Mr. A. Robert. *Purchased* (*Beckett*), 1901.

1. 6. 6. 80. Skull and skin, somewhat older. S. Francisco, São Paulo; same collector. *Same history.*

3. 7. 7. 126. Skull and skin. Chapada, Matto Grosso, Brazil; same collector. *Presented by Mrs. Percy Sladen*, 1903.

3. 7. 7. 127. Skull and skin. Same locality and collector. *Same history.*

3. 7. 7. 128. Skull and skin, female. Same locality and collector. *Same history.*

8. 8. 19. 1. Skull and skin. Villa Rica, Paraguay. *Presented by the Hon. W. H. Hugessen*, 1908.

8. 8. 19. 2. Skull, imperfect, and skin. Same locality. *Same history.*

10. 5. 4. 56. Skull and skin. Rio Supinaam, British Guiana. *Presented by F. V. McConnell, Esq.*, 1910.

10. 11. 10. 10. Skull and skin. Bartica Grove, Essequibo Valley, British Guiana. *Same history.*

11. 12. 15. 3. Skull and skin. Same locality. *Same donor*, 1911.

11. 12. 15. 4. Skull and skin. Same locality. *Same history.*

12. 6. 5. 31. Skull and skin. Bonasica Creek, British Guiana. *Same donor*, 1912

12. 12. 19. 10. Skull and skin. Bonasica Creek, British Guiana. *Same history.*

5. 11. 1. 20. Skull and skin, young. Georgetown, Demerara; collected by S. B. Warren, Esq. *Purchased*, 1905.

## B.—Dicotyles tajacu torvus.

Tayassu torvus, *Bangs*, *Proc. Biol. Soc. Washington*, vol. xii, p. 164, 1898.

Dicotyles tajacu torvus, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 382, 1901.

Tagassu torvus, *Elliot*, *Cat. Mamm. Field Mus.* (*Field Mus. Zool. Pub.* vol. viii) p. 35, 1907.

Tayassu torvum, *Osgood*, *Field Mus. Zool. Pub.* vol. x, p. 46, 1912.

Typical locality Santa Marta district, Colombia.

Type in U.S. National Museum, Washington.

Skull relatively small, short, wide, and depressed.

*The reference of the following specimens to this race is provisional:—*

97. 11. 7. 56. Skull and skin, young. Cachavi, Ecuador; collected by Mr. W. F. H. Rosenberg. *Purchased*, 1897.

99. 10. 3. 65. Skull and skin, young. Near Bogota, Colombia; collected by Mr. G. D. Child.

*Presented by O. Thomas, Esq.*, 1899.

14. 11. 6. 2. Skull and skin. Rio César Valley, Colombia; collected by W. K. Pomeroy, Esq.

*Presented by the Zoological Society*, 1914.

## C.—Dicotyles tajacu niger.

Dicotyles torquatus, *Tomes*, *Proc. Zool. Soc.* 1860, p. 262; nec *Cuvier*.

Tayassu niger, *Allen*, *Bull. Amer. Mus. Nat. Hist.* vol. xxxii, p. 476, 1913.

Typical locality Esmeraldas, Ecuador.

Type in American Museum of Natural History, New York.

Differs from both the preceding races by the general colour being nearly uniform black instead of grizzled grey or tawny.

97. 11. 7. 56. Skin, young female, provisionally referred to this race. Cachavi, Ecuador.

*Presented by O. Thomas, Esq.*, 1897

## III. DICOTYLES (PECARI) ANGULATUS.

Dicotyles angulatus, *Cope, Amer. Nat.* vol. xxiii, p. 147, 1889; *Weber, Säugethiere*, p. 652, 1904.

Tayassu angulatus, *Bangs, Proc. Biol. Soc. Washington*, vol. xii, p. 165, 1898; *Merriam, ibid.* vol. xiv, p. 120, 1901; *Stone and Cram, American Animals*, p. 30, 1903 (angulatum).

Dicotyles tajacu angulatus, *Lydekker, Great and Small Game of Europe, etc.* p. 381, 1901.

Tagassu angulatum, *Elliot, Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 63, 1904, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 34, 1907.

Pecari angulatus, *Miller, List N. Amer. Mamm.* p. 383, 1912.

Typical locality Guadelupe Valley, Texas.

General characters those of *D. tajacu*, but palate with sharp ridge reaching from first premolars to bases of sockets of canines; nasal bones more angulated in median line; last upper premolar quadrangular, with four main tubercles and intermediate tubercles; molars wrinkled; sides of cranial rostrum deeply excavated above premolars. When only one form of peccari with this type of skull and dentition was known, the writer regarded it as a race of *D. tajacu*, now that a number are recognised, it is convenient to allow specific rank to this type, of which the local races are distinguishable as follows:—

A. Size larger.
  *a*. Shoulder-stripe white; sides of body black and white ..... *D. a. angulatus.*
  *b*. Shoulder-stripe yellowish ochery, narrow; sides greyer ..... *D. a. humeralis.*
  *c*. Shoulder-stripe broad; sides whitish ..... *D. a. yucatanensis.*
  *d*. Shoulder-stripe indistinct, very narrow; sides grizzled grey ..... *D. a. crassus.*
  *e*. Shoulder-stripe indistinct; sides mixed greyish and brownish black ..... *D. a. sonoriensis.*
  *f*. Shoulder-stripe wide and tawny ..... *D. a. crusnigrum.*
B. Size smaller; sides grizzled black and buff ..... *D. a. nanus.*

### A.—Dicotyles angulatus angulatus.

Pecari angulatus angulatus, *Miller, List N. Amer. Mamm.* p. 383, 1912.

Typical locality Guadelupe Valley, Texas.

General colour black and white, shoulder-stripe white.

The range includes Texas and north-eastern Mexico.

No specimen in collection.

## B.—Dicotyles angulatus sonoriensis.

Dicotyles angulatus sonoriensis, *Mearns*, *Proc. U.S. Nat. Mus.*, vol. xx, p. 469, 1897.

Dicotyles tajacu sonoriensis, *Lydekker*, *Great and Small Game of Europe*, *etc.* p. 382, 1901.

Tayassu angulatus sonoriensis, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv. p. 120, 1901.

Tagassu angulatum sonoriense, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 64, 1904.

Pecari angulatus sonoriensis, *Miller*, *List N. Amer. Mamm.* p. 383. 1912.

Typical locality San Bernadino Valley, Sonora, Mexico.

Type in U.S. National Museum, Washington.

Larger and paler than typical race, with bigger ears and feet, and smaller and simpler molars; general colour greyish and brownish black, with a sharply contrasting black dorsal stripe, and the light shoulder-stripe indistinct; young pale reddish brown, with a black dorsal stripe.

12. 7. 3. 1. Skin, mounted. Sonora.

*Presented by I. N. Dracopoli, Esq.*, 1912.

## C.—Dicotyles angulatus humeralis.

Tayassu angulatus humeralis, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 122, 1901.

Tagassu angulatum humerale, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 63, *Check-List Mamm. N. Amer. etc.* (*ibid.* vol. vi) p. 35, 1905, *Cat. Mamm. Field Mus.* (*ibid.* vol. viii) p. 34, 1907.

Pecari angulatus humeralis, *Miller*, *List N. Amer. Mamm.* p. 383, 1912.

Typical locality America, State of Colima, Mexico.

Type in U.S. National Museum, Washington.

Generally similar to typical race, but flanks greyer, head yellower, dorsal stripe more pronounced, and shoulder-stripe yellowish ochery; skull of female larger, with longer row of cheek-teeth.

The range extends from Colima to Tehuantepec.

98. 3. 2. 151. Skull and skin. Sinaloa, Southern Mexico; collected by Mr. P. O. Simons.

*Purchased* (*Price*), 1898.

## D.—Dicotyles angulatus crassus.

Tayassu angulatus crassus, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 124, 1901.

Tagassu angulatum crassum, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 64, 1904.

Pecari angulatus crassus, *Miller*, *List N. Amer. Mamm.* p. 383, 1912.

Typical locality Metlaltoyuca, State of Puebla, Mexico.

Type in U.S. National Museum, Washington.

Size larger and coat coarser than in typical race; general colour grizzled grey, with a black dorsal stripe; shoulder-stripe very narrow and indistinct.

No specimen in collection.

## E.—Dicotyles angulatus yucatanensis.

Tayassu angulatus yucatanensis, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 123, 1901.

Tagassu angulatum yucatanense, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 63, 1904.

Pecari angulatus yucatanensis, *Miller*, *List N. Amer. Mamm.* p. 383, 1912.

Typical locality Tunkas, Yucatan.

Type in U.S. National Museum, Washington.

General colour much whiter than in typical race, with the shoulder-stripe very wide and conspicuous; female not larger than male; nasals more acute and shorter than in *D. a. angulatus*.

## F.—Dicotyles angulatus crusnigrum.

Tayassu crusnigrum, *Bangs*, *Bull. Mus. Harvard Coll.* vol. xxxix, p. 20, 1902.

Tagassu crusnigrum, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 65, 1904.

Pecari crusnigrum, *Miller*, *List N. Amer. Mamm.* p. 383, 1912.

Typical locality Boquete, Chiriqui, Panama.

Type in Harvard College Museum.

Specially distinguished by the width and tawny colour of the shoulder-stripe.

No specimen in collection.

### G.—Dicotyles angulatus nanus.

Tayassu nanus, *Merriam*, *Proc. Biol. Soc. Washington*, vol. xiv, p. 102, 1901.

Tagassu nanus, *Elliot*, *Mamm. Mid. Amer. and W. Indies* (*Field Mus. Zool. Pub.* vol. iv), p. 62, 1904.

Pecari nanus, *Miller*, *List N. Amer. Mamm.* p. 384, 1912.

Typical locality Cozumel Island, off Yucatan.

Type in U.S. National Museum, Washington.

A dwarf island-race, characterised by its grizzled black and buff general colour, dark dorsal stripe, and wide buffish shoulder-stripe.

No specimen in collection.

## Family II.—HIPPOPOTAMIDÆ.

Head terminating in a broad, rounded muzzle, at the summit of which are the nostrils; feet four-toed, with the middle pair, at least, connected by membrane, and all four touching the ground in the ordinary standing posture; incisors and canines growing from persistent pulps, the upper curved and directed downwards, the lower incisors straight and procumbent, and the canines curved and directed upwards; molars with trefoil-shaped dentine islands (fig. 55); a descending flange to hind part of mandible, and lateral aspect of gape S-shaped.

Restricted at the present day to Ethiopian Africa, but in the Pleistocene and Pliocene spread over a large part of the Old World, including England.

### I. Genus HIPPOPOTAMUS.

Hippopotamus, *Linn. Syst. Nat.* ed. 10, vol. i, p. 74, 1758, ed. 12, vol. i, p. 101, 1766; *Giebel*, *Säugethiere*, p. 217, 1855; *Gray*, *Cat. Carnivora, etc. Brit. Mus.* p. 356, 1869; *Lydekker*, *Pal. Indica* (*Mem. Geol. Surv. India*), ser. 10, vol. iii, p. 47, 1884, *Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 277, 1885, *Game Animals of Africa*, p. 403, 1908; *W. L. Sclater*, *Fauna S. Africa*, *Mamm.* vol. i, p. 269, 1900; *Anderson and de Winton*, *Mamm. Egypt*, p. 356, 1902.

Tetraprotodon, *Falconer and Cautley, Asiatic Researches*, vol. xix, p. 51, 1836; *Owen, Odontography*, p. 566, 1840–45.

Tetraproctodon, *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 356, 1869, errorim.

Dentition: $i.\frac{2-3}{2-3}, c.\frac{1}{1}, p.\frac{4}{4}, m.\frac{3}{3} = 42$ or 44; size, at least in the existing species, very large, and the head disproportionately big, with an extremely broad muzzle, very prominent eyes, and small rounded ears; body elongated; tail and limbs short, the latter with the digits closely approximated, connected up to the hoofs by membrane, and thus almost incapable of lateral expansion.

Distribution co-extensive with that of the family. The Pliocene subgenus *Hexaprotodon*, as typified by *H. sivalensis*, has three pairs of subequal incisors in each jaw.

## HIPPOPOTAMUS AMPHIBIUS.

Hippopotamus amphibius, *Linn. Syst. Nat.* ed. 10, vol. i, p. 75, 1758, ed. 12, vol. i, p. 101, 1769; *Schreber, Säugthiere*, pl. cccviii, 1791; *A. Smith, Illustr. Zool. S. Africa*, vol. i, pl. vi, 1838: *Gray, List Mamm. Brit. Mus.* p. 188, 1843, *Proc. Zool. Soc.* 1868, p. 491, *Cat. Carnivora, etc. Brit. Mus.* p. 356, 1869, *Hand-List Thick-skinned Mamm.* p. 71, 1873; *Peters, Säugeth. Mossambique*, p. 180, 1852, *Monatsber. Ak. Berlin*, 1854, p. 367; *Wolf, Zool. Sketches*, vol. i, pl. xxvii, 1861; *Gerrard, Cat. Bones Mamm.* p. 284, 1862; *Garrod, Trans. Zool. Soc.* vol. xi, p. 11, 1880; *Lydekker, Pal. Indica* (*Mem. Geol. Surv. India*), ser. 10, vol. iii, p. 47, 1884, *Cat. Foss. Mamm. Brit. Mus.* pt. ii, p. 277, 1885, *Great and Small Game of Africa*, p. 532, 1899, *Game Animals of Africa*, p. 403, 1908; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 365, 1884; *Flower, Proc. Zool. Soc.* 1887, p. 619; *W. L. Sclater, Cat. Mamm. Ind. Mus.* pt. ii, p. 197, 1891, *Fauna S. Africa, Mamm.* vol. i, p. 269, 1900; *Nicolls and Eglington, Sportsman in S. Africa*, p. 65, 1892; *Matschie, Säugeth. Deutsch-Ost-Africa*, p. 98, 1895; *Selous, Great and Small Game of Africa*, p. 533, 1899; *Rothschild, Powell-Cotton's Abyssinia*, p. 480, 1902; *Anderson and de Winton, Mamm. Egypt*, p. 356, 1902; *Boussac, Rev. Scient.* ser. 5, vol. i, p. 425, 1904; *Wolf, Ber. Senckenb. Ges.* vol. xli, p. 7, 1910; *Beddard, Proc. Zool. Soc.* 1910, p. 270, *Cambridge Nat. Hist., Mamm.* p. 273, 1902; *Miller, Smithson. Misc. Collect.* vol. lxiv, no. 7, p. 3, 1910; *Maurer, Anat. Anz.* vol. xxxviii, p. 145, 1911; *Lönnberg, K. Svenska Vet.-Ak. Handl.* vol. xlviii, no. 5, p. 136, 1912; *Allen, Bull. Mus. Harvard Coll.* vol. lviii, p. 323, 1914.

Hippopotamus abyssinicus, *Lesson, Nouv. Tabl. Règne Anim., Mamm.* p. 158, 1842; nomen nudum.

Hippopotamus typus, *Duvernoy, C. R. Ac. Sci. Paris*, vol. xiv, p. 33, 1846.

Hippopotamus (Tetraprotodon) amphibius, *Falconer. Journ. Ac. Sci. Philad.* ser. 2, vol. i, p. 237, 1849, *Pal. Mem.* vol. ii, p. 405, 1868.

Hippopotamus senegalensis, *Falconer, Journ. Ac. Sci. Philad.* ser. 2, vol. i, p. 237, 1849; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 357, 1869: quoted—but not recognised as a species, as if from Desmoulins, *Journ. Physiol.* vol. v, p. 354, 1825, where, however, according to Miller (1910), no such name was given.

Typical locality Nile Valley.

Size very large—length of head and body about 14 feet; two pairs of incisors in each jaw, the inner pair in lower jaw

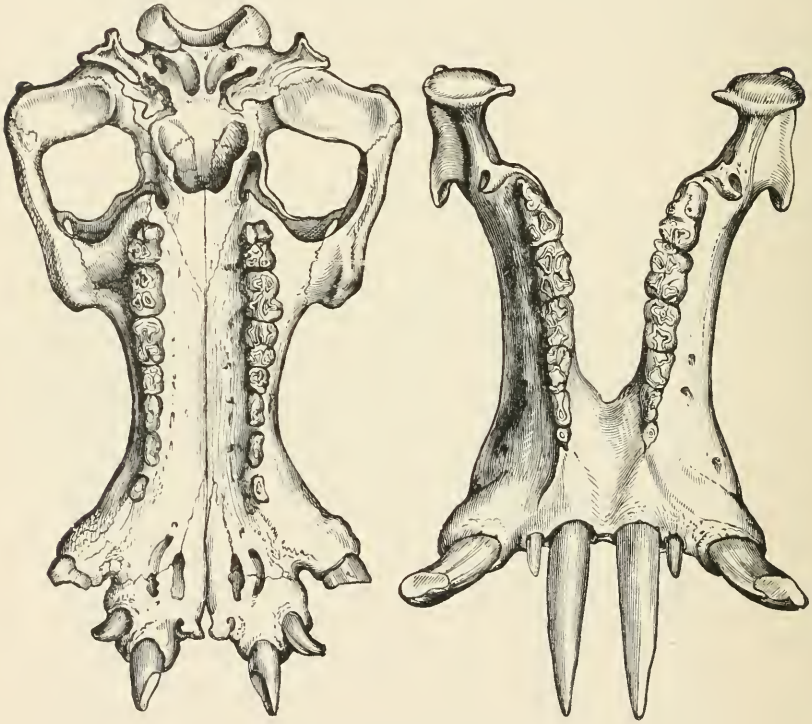


Fig. 55.—Palatal Aspect of Skull and Lower Jaw of Hippopotamus (*Hippopotamus amphibius*).

much larger than the outer; neck very short and line of back but little arched; skin, with the exception of bristles on the muzzle and tail, nearly naked, and forming heavy folds on neck, shoulders, and sides of chest.

The distributional area formerly included suitable locali-

ties over the greater part of Ethiopian Africa, exclusive of the forest-tract, and in the Pleistocene embraced a large part of Europe.

The five following races are recognised:—

A. Width of orbit not exceeding height.
  *a*. Skull with moderate preorbital constriction and convex upper surface ..... *H. a. amphibius.*
  *a'*. Size larger, colour darker.
    $a^2$. Orbits less prominent ..... *H. a. amphibius.*
    $b^2$. Orbits more prominent..... *H. a. tschadensis.*
  *b'*. Size smaller, colour lighter ..... *H. a. koboko.*
  *b*. Skull with deeper preorbital constriction and flatter upper surface ..... *H. a. constrictus.*
B. Width of orbit exceeding height, and flattening of skull still greater than in *b* ..... *H. a. australis.*

## A.—Hippopotamus amphibius amphibius.

Hippopotamus amphibius amphibius, *Schwarz*, *Ann. Mag. Nat. Hist.* ser. 8, vol. xiii, p. 31, 1914.

Typical locality Nile Valley.

Skull with moderate preorbital constriction, convex upper surface, long mandibular symphysis, and relatively large cheek-teeth.

The reference to this race of the undermentioned Gambian specimens, and also of those of which the locality is unknown, is provisional.

726, *b*. Fore part of lower jaw, with canines and incisors. Locality unknown. *No history.*

726, *d*. Skull. Gambia, West Africa.
*Presented by the Earl of Derby, about* 1848.

726, *j*. Skeleton, imperfect. West Africa (?), Gambia; collected by Mr. Dalton. *Same history.*

41. 1. 14. 45 (726, *c*). Lower canine, immature. Locality unknown; collected by Dr. G. Mantell. *Purchased*, 1841.

46. 3. 19. 1 (726, *c*). Lower canine. Locality unknown; collected by Mr. Harnett. *Purchased*, 1846.

51. 11. 10. 12 (726, *b*). Skull, young. Locality unknown.
*Purchased* (*Zoological Society*), 1851.

68. 2. 12. 1. Skull, female. Locality unknown.
*Presented by Executors of Dr. H. Falconer*, 1868.

74. 6. 4. 2. Skull. White Nile.

*Presented by Sir Samuel Baker*, 1874.

83. 12. 20. 1. Skin, mounted. Nile, from an animal presented to the Zoological Society by the Pasha of Egypt.

*Purchased* (*Zoological Society*), 1883.

87. 12. 29. 1. Skull. Kilwa Kisi-wani, south of Zanzibar. *Presented by Lieut. W. C. Reid, R.N.*, 1887.

87. 12. 29. 2. Skull, female. Same locality.

*Same history.*

* * * *. Fœtus in alcohol. Figured *Proc. Zool. Soc.* 1868, p. 491, and *Cat. Carnivora, etc.*, p. 357. *Purchased.*

5. 8. 25. 1. Skin, mounted. Lower Zambesi. Miller, *op. cit.* refers the Zambesi hippopotamus to the present, and not to the southern race.

*Presented by J. Rowland Ward, Esq.*, 1905.

7. 10. 25. 2. Skull. Portuguese East Africa (? Beira).

*Presented by F. Vaughan Kirby, Esq.*, 1907.

7. 11. 17. 2. Skull, immature. Pangani Valley, Portuguese East Africa.

*Presented by Rear-Admiral R. Montgomerie, C.B.*, 1907.

8. 4. 3. 8–9. Two skulls. Luenta Valley, Portuguese Zambesia. *Presented by Mr. C. H. B. Grant*, 1908.

12. 12. 8. 1. Skull, with damaged brain-case. Inhambane, Portuguese East Africa.

*Presented by T. Thompson, Esq.*, 1912.

12. 12 8. 2. Skull, in very similar condition to the last.

*Same history.*

726, *b*. Front of lower jaw, with canines and incisors. Locality unknown. *No history.*

41. 1. 14. 45 (726, *c*). Lower canine, immature. Locality unknown; collected by Dr. G. Mantell. *Purchased*, 1841.

46. 3. 19. 1 (726, *c*). Abnormally elongated lower canine, from an aged animal. Locality unknown.

*Purchased* (*Harnett*), 1846.

## B.—Hippopotamus amphibius tschadensis.

Hippopotamus amphibius tschadensis, *Schwarz, Ann. Mag. Nat. Hist.* ser. 8, vol. xiii, p. 31, 1914.

Typical locality Katuna, Bornu, N.W. Africa.

Type in Senckenberg Museum, Frankfurt-am-Main.

Nearly allied to typical race, but with the orbits more prominent; distinguished from *H. a. australis* (*infra*) by the much shorter and wider facial region and the more forward direction of the orbits.

10. 9. 30. 1. Skull, provisionally referred to this race. Lagos, Southern Nigeria.

*Presented by J. R. Norman, Esq.*, 1910.

15. 2. 3. 1. Skull, very large, provisionally referred to this race. Zaria Province, Nigeria; collected by Capt. G. F. Abadie. *Presented by Major-Gen. H. R. Abadie, C.B.*, 1915.

### C.—Hippopotamus amphibius kiboko.

Hippopotamus amphibius kiboko, *Heller*, *Smithson. Misc. Collect.* vol. lxi, no. 22, p. 1, 1914.

Typical locality Lake Naivasha, British E. Africa.

Type in U.S. National Museum, Washington.

Size smaller than in typical race, colour lighter, and ears and tail-tip more thickly haired than in *H. a. australis;* skull with very broad nasals, relatively small rostral constriction, and great elevation of orbits and occipital crest above the deeply hollowed interorbital region. The orbits are more nearly circular than in *H. a. australis*, and more prominent than in *H. a. constrictus*, which also differs by the greater rostral constriction and shorter mandibular symphysis.

14. 1. 7. 1–2. Two skulls, provisionally referred to this race. Lower Baringo Valley, B. E. Africa.

*Presented by G. Blaine, Esq.*, 1914.

### D.—Hippopotamus amphibius constrictus.

Hippopotamus constrictus, *Miller*, *Smithson. Misc. Collect.* vol. liv, no. 7, p. 1, 1910.

Hippopotamus amphibius constrictus, *Heller*, *Smithson. Misc. Collect.* vol. lxi, no. 22, p. 1, 1914.

Typical locality Angola.

Type in U.S. National Museum, Washington.

Skull lighter than in typical race, with the preorbital constriction deeper, the upper surface more flattened, the muzzle less expanded, the mandibular symphysis shorter, and the cheek-teeth smaller.

No specimen in collection.

## E.—Hippopotamus amphibius australis.

Hippopotamus australis, *Duvernoy, C. R. Ac. Sci. Paris*, vol. xiv, p. 333, 1846; *Miller, Smithson. Misc. Collect.* vol. liv, no. 7, p. 3, 1910.

Hippopotamus capensis, *Falconer, Journ. Ac. Sci. Philad.* ser. 2, vol. i, p. 237, 1849; *Blyth, Cat. Mamm. Mus. Asiat. Soc. Bengal*, p. 142, 1863; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 357, 1869; quoted—although not recognised as a species—as from Desmoulins, *Journ. Physiol.* vol. v, p. 354, 1825, where, however, according to Miller (1910), no such name was given.

Hippopotamus amphibius capensis, *Heller, Smithson. Misc. Collect.* vol. lxi, no. 22, p. 1, 1914.

Hippopotamus amphibius australis, *Schwarz, Ann. Mag. Nat. Hist.* ser. 8, vol. xlii, p. 32, 1914.

Typical locality Cape Colony.

Skull apparently still more flattened than in *H. a. tschadensis*, so that the width of the orbit is greater than the height.

726, *a*. Skull. South Africa. *No history.*

51. 12. 23. 4. Skull, young. South Africa. *Purchased (Stevens)*, 1851.

63. 11. 12. 51. Skull. Cape Colony. Formerly in Museum of Linnean Society. *Purchased (Stevens)*, 1863.

69. 8. 13. 2. Skull. Natal; collected by Mr. B. Isaacson. *Purchased*, 1869.

13. 1. 31. 1. Pair of lower tusks. South Africa. *Presented by J. C. Lyell, Esq.*, 1913.

## II. Genus CHŒROPSIS.

Diprotodon, *Duvernoy, C. R. Ac. Sci. Paris*, vol. xxix, p. 277, 1849; nec *Owen*, 1838.

Chœrodes, *Leidy, Proc. Ac. Sci. Philad.* 1852, p. 52; nec *White*, 1846.

Chœropsis, *Leidy, Journ. Ac. Sci. Philad.* ser. 2, vol. ii, p. 213, 1853; *Gratiolet, Recherches Anat. Hippopotame*, p. 202, 1867; *Milne-Edwards, Rech. Mamm.* p. 77, 1868; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 357, 1869; *Macalister, Proc. R. Irish Ac.* ser. 2, vol. i, p. 494, 1873; *Peters, Monatsber. Ak. Berlin*, 1873, p. 445; *Chapman, Proc. Ac. Sci. Philad.* 1893, p. 185; *Beaux, Zool. Anz.* vol. xl, p. 227, 1912; *Pocock, Field*, vol. cxxi, p. 336, 1913.

Ditomeadon, *Gratiolet, Gervais' Zool. et Pal. Gén.* ser. 1, p. 250, 1860, *Recherches Anat. Hippopotame*, p. 202, 1867.

Diproctodon, *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 357, 1869, errorim.

Dentition: $i.\frac{2}{1}$, $c.\frac{1}{1}$, $p.\frac{4}{4}$, $m.\frac{3}{3} = 38$; build comparatively light; bodily size and head relatively small; eyes not markedly prominent; limbs proportionately much longer than in typical genus, with the feet (fig. 56) approximating in general characters to those of pigs, the lateral digits, although touching the ground, free from webbing, and the two middle toes, in spite of a basal web, subspatulate, and capable of a considerable amount of lateral spreading.

Restricted at the present day to West Africa.

## CHŒROPSIS LIBERIENSIS.

Hippopotamus minor, *Morton, Proc. Ac. Sci. Philad.* 1844, p. 14; nec *Desmarest*, 1882.

Hippopotamus liberiensis, *Morton, Journ. Ac. Sci. Philad.* ser. 2, vol. i, p. 232, 1849; *Flower and Garson, Cat. Osteol. Mus. R. Coll. Surg.* pt. ii, p. 365, 1884; *Lydekker, Pal. Ind. (Mem. Geol. Surv. India)*, ser. 10, vol. iii, p. 47, 1884, *Great and Small Game of Africa*, p. 532, 1999, *Game Animals of Africa*, p. 412, 1908; *Flower, Proc. Zool. Soc.* 1887, p. 612; *Flower and Lydekker, Study of Mammals*, p. 280, 1891; *Rendall, Great and Small Game of Africa*, p. 543, 1899; *Weber, Säugethiere*, p. 646, 1904.

Diprotodon liberiensis, *Duvernoy, C. R. Ac. Sci. Paris*, vol. xxix, p. 277, 1849.

Hippopotamus (Tetraprotodon) liberiensis, *Falconer, Journ. Ac. Sci. Philad.* ser. 2, vol. 1, p. 237, 1849, *Pal. Mem.* vol. ii, p. 405, 1868.

Chœrodes liberiensis, *Leidy, Proc. Ac. Sci. Philad.* 1852, p. 52.

Chœropsis liberiensis, *Leidy, Journ. Ac. Sci. Philad.* ser. 2, vol. ii, p. 213, 1853; *Milne-Edwards, Rech. Mamm.* p. 77, 1868; *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 357, 1869, *Hand-List Thick-skinned Mamm. Brit. Mus.* p. 79, 1873; *Macalister, Proc. R. Irish Ac.* ser. 2, vol. i, p. 494, 1873; *Peters, Monatsber. Ak. Berlin*, 1873, p. 445; *Jentink, Notes Leyden Mus.* vol. x, p. 29, 1885; *Chapman, Proc. Ac. Sci. Philad.* 1893, p. 185; *Beaux, Zool. Anz.* vol. xl, p. 227, 1912.

Ditomeadon liberiensis, *Gratiolet, Gervais' Zool. et Pal. Gén.* ser. 1, p. 250, 1860, *Recherches Anat. Hippopotame*, p. 202, 1867.

Hippopotamus (Tetraprotodon) liberianus, *Gerrard, Cat. Bones Mamm. Brit. Mus.* p. 284, 1862. errorim.

Tetraproctodon liberiensis, *Gray, Cat. Carnivora, etc. Brit. Mus.* p. 357, 1869, *misquotation of Falconer's* Hippopotamus (Tetraprotodon) liberiensis.

Hippopotamus (Chœropsis*) liberiensis, *Lydekker, Ward's Records of Big Game*, ed. 7, p. 451, 1914.

Typical locality St. Paul's River, Liberia.

Type in Museum of Philadelphia Academy of Natural Science.

* *Errorim, Chœropotamus.*

Size approximately that of a large wild boar; body shorter than in *Hippopotamus*, with the line of the back much arched, and the croup sloping away behind; skin much as in typical genus.

Distribution, at the present day, co-extensive with that of the genus.

50. 7. 5. 1 (1312, *a*). Cast of type skull. Original from St. Paul's River, Liberia.

*Presented by Dr. S. G. Morton*, 1850.

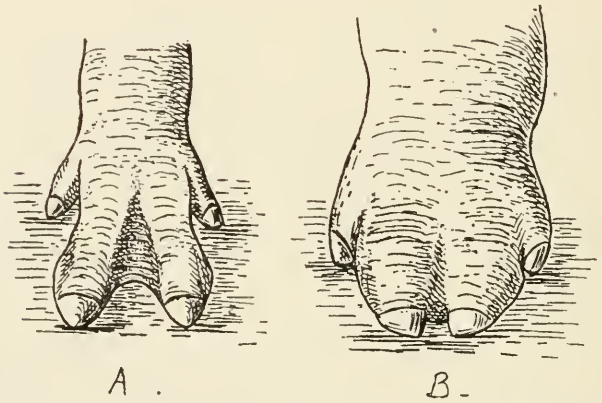



Fig. 56.—Fore-feet of Pigmy Hippopotamus (*Chœropsis liberiensis*), *A*, and ordinary Hippopotamus (*Hippopotamus amphibius*), *B*.
From Pocock, *The Field*, 1913.

87. 9. 15. 1 (1312, *b*). Skin and skeleton, mounted. Du Queah River, Liberia; collected by Dr. J. Büttikofer. Noticed by Flower, *Proc. Zool. Soc.* 1887, p. 612.

*Purchased*, 1887.

8. 10. 22. 1. Skin, immature, mounted. Liberian frontier of Sierra Leone. *Presented by J. Rowland Ward, Esq.*, 1908.

14. 6. 21. 1. Skull and skin, old and large female. Moa Valley, Daru, Sierra Leone; collected by R. M. S. Baynes, Esq. *Purchased*, 1914.

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